WASHINGTON MEWS PROJECT

To the Hastings on Hudson Planning Board for October 15, 2015:

We are resubmitting drawings 1-6, 10 and new drawings 15 and 16. There are no revisions to 1 and 2 but these are included for completeness. Drawings 3,4,5,&6 are reissued to show our new roof access provisions to replace the spiral stairs at the West houses, Dwg 10 has been revised to up date open space and parking totals, new drawing 15 illustrates all open space provisions, and new drawing 16 illustrates the location of test wells and building height flags on the existing site.

Current variances required are as follows:

COVERAGE:

Relief from Article 295-18 and 295-72-2 E-4 restricting coverage to 80% in this MRC district to allow coverage of 87.8% on this site.

Applicant's argument:

Site coverage as defined in 295-5 does not refer to subgrade structures. Structure as also defined in 295-5 refers only to structures above grade. If the Mews area is considered open space which it is, then the project complies.

PARKING:

Relief from the strict application of 295-36A to permit the provision of 25 spaces in lieu of the 29 required. (See #6 below re possible increase in variance required)

Relief from 295-29B requiring that maneuvering aisles be 25' to permit a 24' standard width in this instance.

Applicant's argument:

2 spaces are required only due to the existence of a small administrative/maintenance office within the common area of the project . This will be used for very short periods of time. 25 spaces is adequate for 16 dwelling units. 24' maneuvering aisles are nationally accepted and meet New York State and New York City requirements.

YARD REQUIREMENTS:

Relief from the application of 295-72.2(e)1 and 295-20G interpreted by the Building Dept to require a 27' setback on the west side of the site and 25' on the east.

Applicant's argument:

No set back is required as the abutting MR-C district is not a residential district as defined under 295-5.

Of the 22 properties that comprise the MR-C district none comply with this interpretation and only 3 have any side yard setbacks at all.

USE OF VILLAGE LANDS:

The board is requested to recommend to the ZBA and B of T that an easement be granted to permit development of a pedestrian path and steps across village lands north of the site to provide a means of egress for, and a public pedestrian route through, the project.

It is understood that this agreement will provide for reciprocal access by the public to the pedestrian mews area of the project.

OTHER ISSUES RAISED IN PRIOR MEETINGS OF THE BOARD:

(1) New York State Code review of the project

This has been carried out by Mr. Minozzi and meetings have been held to discuss all issues raised. The following items are being forwarded to Erika Krieger at the Dept of State for resolution or identification of any variance required:

(1) Application of ADA to the Mews area with regard to the need for a Second Accessible exitway.
Provision of this is clearly impossible for this scheme. Our position is that ADA does not apply to this project at all excepting the Café. See ADA interpretation received from their regional office. We also consider the entire Mews area to be a "Public way" as defined in the Village and State Codes.

(2) Issue per 1024.3 which requires that Exit discharge points be more than 10' from a P.L. Our north exit stair from the Mews discharges more than 10' from the P.L. but
portions of the stair above that point are less than 10' from the P.L.
We can redesign this stair but feel that 1024.3 really relates to discharge points, not the stair itself, particularly if provided with appropriate fire separations.

(3) You are applying 704.2 to disallow our 5' deep balconies on our west units which extend to the P.L..
We believe this section applies to cantilevered balconies and roof overhangs , not to recessed spaces behind the building line.

(4) Variance required for substitution of 4' wide path and steps at the north exitway for 10' wide accessible "public way".
We have no accessible access to this exitway and no way to provide one.

(5) Confirm that we are allowed 25% unprotected openings 5'+ away from the West P.L. in our R-2 fully sprinkled building.

We have attached copies of emails received from the ADA Regional Office which clarify its application to this project.

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(2) View Preservation

Three flags indicating the heights and extreme lengths of the fronts of the West Houses as currently drawn have been maintained on site.

Supporting document: Two emails received from the ADA regional Office

Good Morning Mr. Baldwin:

I am writing in response to your question below.

The ADA does not typically apply to multi-family residential housing, unless there is a some sort of funding involved in the project from state/local government funds. If this is a privately funded development, the ADA does not apply, to the units, but would apply to any areas open to the public (i.e. a leasing or sales office, etc...).

Having said that, the federal law that is typically applied to multi-family housing is the Fair Housing Act (FHA) – which applies to newly constructed multi-family housing where there are four or more units attached in a structure. There is an exception in the Fair Housing Act design guidelines however for multi-story units (they are not required to comply with FHA). So if all of the units in your project are multi-story units (finished living space on one floor and the floor immediately above/below) then they are exempt from FHA. If you have single story units in the project, those would likely have to meet FHA.

Given all of this, the applicable code that I see for your project would be the 2010 Building Code of NYS (assuming your project is located in NYS). The NYS Building Code contains the following exception in Chapter 11 – Section 1107 for R-2 occupancies:

1107.7.2 Multistory units. A multistory dwelling or sleeping unit which is not provided with elevator service is not required to be a Type B unit. Where a multistory unit is provided with external elevator service to only one floor, the floor provided with elevator service shall be the primary entry to the unit, shall comply with the requirements for a Type B unit and a toilet facility shall be provided on that floor.

RE: the parking, it is advisable to provide at least one accessible parking space in the garage that meets the requirements of the NYS building code, so the space should be at least 8 feet wide with an adjacent minimum 8 feet wide access aisle.

Thank you for contacting the Northeast ADA Center.

Best Regards,

Jennifer Perry

Hello Ned:

If you look at ICC ANSI A117.1 Section 502.4.3 as I indicated below, you will see that ANSI requires the access aisle for the space (either van or car accessible) to be as long as the space it serves. The 20' length you are referring to is for a passenger loading zone, not an accessible parking space or access aisle. I think you are misunderstanding these two items. A passenger loading zone is not the same thing as an access aisle. The correct code requirement for the van accessible parking space and access aisle is ICC ANSI A117.1 Section 502. Section 503 is for passenger loading zones, not accessible parking spaces or aisles.

Yes, you are required to have one van accessible parking space if you have 25 parking spaces in the lot.

I hope this clarifies the requirement for you.

Thank you-

Best Regards,

Jennifer Perry
Access Specialist
ILR School, Cornell University
800.949.4232
Direct: 732.449.3621

K.Lisa Yang and Hock E. Tan
Employment and Disability Institute
jlp359@cornell.edu
www.northeastada.org

(3) Storm water treatment system

A meeting was held with Frank Annunziata of James J. Hahn Engineering PC by the undersigned and our Civil Engineering consultant, Larry Nardecchia. It was agreed that two deep well percolation tests would be carried out on site at a depth of 17' below the existing grade. In addition it was agreed that a single observation well should be installed to the foundation bearing depth of 21' below the existing grade. This would provide us with reassurance that non cohesive soils were present., these being unlikely to have their bearing capacity affected by water saturation, and that no hard rock or high water table exists at the site. Obviously if rock is encountered a more extensive investigation would be required. Any rock excavation, should it be required, would be carried out by a chipping process, not by blasting. See item (7) below for more on excavation process. At this meeting the location of all three wells was agreed.

A contract for this work has been awarded to Soil Testing Inc. of Oxford CT.

We hope to have preliminary results by the time of your meeting.

(4) Open Space Provisions

One member of the board asked that we better illustrate the open space provisions of the project rather than the simple numerical tabulation shown on Drawing 10. We have added drawing Number 15 which attempts to do this.

(5) We have added drawing Number 16 which locates the building facades, height flags and subsurface investigation wells in plan atop the site existing condition survey.

(6) Accessible Parking Space

Mr. Minozzi has indicated that he expects that at least one van accessible parking space will be provided in the project regardless of ADA specifications as it is required by the NY State Code. We have not altered Dwg 1 to show this space as he is considering two alternative solutions either one of which is entirely acceptable to us. These are:

(a) Making space #25 the accessible space and leaving the column in the access aisle as is permitted in the State Code. This solution allows for a 20' long access aisle with no difficulty should that ultimately be mandated, but it does place the accessible space some 56' from the elevator.

(b) Making space #4 the van accessible space and #5 the access aisle thereby reducing our total parking count from 25 to 24 spaces and increasing our parking variance requirement to 5 spaces from 4. Space 4 is 24' from the elevator and is the nearest available space.

We will revise our drawing accordingly when a decision is made on this matter.

(7) SWPPP

The Hahn Engineering review dated August 17th outlines the requirements for the Storm Water Pollution Prevention Plan (SWPPP) which is required for the project. We respectfully request that submission of the SWPPP be made a requirement for issuance of a Building Permit, and not for referral of the project to the ZBA and BofT by the Planning Board. We feel that if we complete the Site Investigation we are undertaking now and obtain satisfactory results (normal perc rates, no cohesive soils, no solid rock, low water table) and that if Hahn Engineering confirm these results, then our client should be spared the expense of completing the full SWPPP until Site Plan approval of the overall project is in hand.

Several ancillary aspects of the SWPPP were mentioned in the Hahn review and by members of the public at the last meeting:

Possible overloading of existing storm sewers already receiving additional water from the Warburton bridge project.

Existing catch basins at the NE, SE, and NW corners of the Warburton and Washington intersection have been deemed adequate to accommodate the extra bridge run off. That at the NE and SE corners now serve a far larger watershed than any of the others. The downstream catch basin in this same system at the SW corner of our site is ideally placed to receive long term pump out of stored water *after* a storm from our site but we emphasize that this is not necessarily to form part of our long term disposal system design.

Nonetheless it offers a "last resort" means for disposing of storm water. Few areas in Hastings are served by storm sewers of any kind. We have reviewed this strategy with Mr. Gunther and he sees absolutely no problem with it. He states that the present system is entirely capable of handling heavy storms indefinitely. The only problem he has is that water coming down the Washington Avenue hill which has no such system during a storm often overshoots Warburton Ave catch basins on its East side.

Cut and Fill analysis of our excavation and means for removal of excess material.

Our excavation will involve the removal of approximately 6750 Cubic Yards of material from the site and the introduction of about 1900 CY of specialized backfill including washed crush stone, sharp concrete sand, and organic topsoil for garden areas. This amounts to about 340 truckloads out over a 3 to 4 week period and as much as 95 truckloads in over a far longer period as work progresses.

Excavation will be by conventional equipment with trucks utilizing Washington Ave. Approximately 150' of temporary steel sheet piling will be required along the east side of the building area to a depth of 20'. This will be driven in a time period of 3 to 4 days before general excavation commences.

(8) We are aware that the board must approve the designation of affordable units. This proposed designation will be agreed between Mr. Cheng and the Affordable Housing Committee and provided to you for approval at the next meeting after October 15th.

BALDWIN & FRANKLIN ARCHITECTS

Edward R. Baldwin
cc: Alex Cheng

Baldwin & Franklin, Architects
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Hastings-on-Hudson, New York 10706
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To the Planning Board **5 November 2015**
Village of Hastings on Hudson

re: Proposed new development at 9-17 Washington Ave - Hastings on Hudson
"Washington Mews" Parcels 4.70 -620- lots 32 and 34

Our submission for your November meeting is the same as that for your October one except for Item 7 where we asked that the full SWPPP be deferred until the time of permitting.

JMC LLC of Armonk has been retained by our client to prepare the full SWPPP and copies are now included in this submission.

No resolution of NYS code issues discussed in our October submission has been received from the Building inspector or Dept of State officials. The latter have declined to provide us with interpretations as a new change of policy prevents them from advising Architects directly. They now advise only local building officials.
Our own interpretations on these issues remains unchanged.

We hope for progress at the forthcoming meeting.

Yours sincerely,
BALDWIN & FRANKLIN ARCHITECTS

Edward R. Baldwin

cc: Alex Cheng, Charles Minozzi

STORMWATER POLLUTION PREVENTION PLAN

WASHINGTON MEWS

9-17 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NEW YORK

Applicant/Operator/ Owner: **RTB Washington, LLC**
12 Hidden Glen Road
Scarsdale, NY 10583

Prepared by:

JMC Project: **15207**

Date: 11/05/2015

TABLE OF CONTENTS

APPENDICES

REFERENCED DRAWINGS FOR SWPPP DESIGN AND DETAILS

JMC DRAWINGS

Dwg. No.	Title	Rev. No./Date
D-1	"Stormwater Plan"	11/05/2015
D-2	"Stormwater Details"	11/05/2015
D-3	"Stormwater Details"	11/05/2015
D-4	"Stormwater Details"	11/05/2015

I. INTRODUCTION

This Stormwater Pollution Prevention Plan has been prepared for the 0.47 acre Washington Mews site, located in Hastings-on-Hudson, Westchester County, New York (hereinafter referred to as the "Site"). The site is bordered by Washington Avenue to the north, residential uses to the south and east, and Warburton Avenue to the west. The development has been designed in accordance with the following:

- Chapter 250 "Stormwater Management, Erosion and Water Pollution Control" of the Hastings-on-Hudson Zoning Code
- New York State Stormwater Management Design Manual.

This project entails the construction of an approximately 20,000 s.f. townhouse complex including a courtyard and subsurface garage.

II. STORMWATER MANAGEMENT PLANNING

As part of the Hastings-on-Hudson site plan approval process, A Stormwater Pollution Prevention Plan (SWPPP) has been prepared for this project because it is a construction activity that involves the disturbance of approximately 20,000 s.f. of land, which exceeds the Hastings-on-Hudson threshold of 10,000 sf. This SWPPP includes stormwater management practices (SMP's) from the "New York State Stormwater Management Design Manual," last revised January 2015.

The proposed stormwater facilities have been designed such that the quantity and quality of stormwater runoff during and after construction are not adversely altered or are enhanced when compared to pre-development conditions.

The Five Step Process for Stormwater Site Planning and Practice Selection

Stormwater management using green infrastructure is summarized in the five step process described below. The five step process was adhered to when developing this SWPPP.

Information is provided in this SWPPP which documents compliance with the required process as follows:

Step 1: Site Planning

Implement planning practices that protect natural resources and utilize the hydrology of the site. Strong consideration must be given to reducing impervious cover to aid in the preservation of natural resources including protecting natural areas, avoiding sensitive areas and minimizing grading and soil disturbance.

Step 2: Determine Water Quality Treatment Volume (WQv)

Determine the required WQv for the site based on the site layout, impervious areas and sub-catchments. This initial calculation of WQv will have to be revised after green infrastructure techniques are applied. The following method has been used to calculate the WQv.

- **90% Rule -** According to the New York State Stormwater Design Manual, Section 4.1, the water quality volume is determined from the 90% rule. The method is based on 90% of the average annual stormwater runoff volume, which must be provided due to impervious surfaces. The Water Quality Volume (denoted as the WQv) is designed to improve water quality sizing to capture and treat 90% of the average annual stormwater runoff volume. The WQv is directly related to the amount of impervious cover created at a site. The average rainfall storm depth for 90% of storms in New York State in one year is used to calculate a volume of runoff. The rainfall depth depends on the location of the site within the state. From this depth of rainfall, the required water quality volume is calculated.

The project is a redevelopment and therefore will comply with the strategies outlined within Chapter 9: Redevelopment Projects of the Design Manual. There are different options to control water quality depending on the redevelopment.

Since the redevelopment results in the creation of additional impervious area, Water Quality Treatment Option II will be utilized which requires treatment for 25% of the existing impervious area, plus 100% of the additional, new impervious area.

The plan proposes that a minimum of 25% of the water quality volume (WQv) from the disturbed area is captured and treated by the implementation of standard practices. When utilizing structural stormwater management practices, these practices should be targeted to treat areas with the greatest pollutant generation potential (e.g. parking areas, service stations, etc).

The NYSDEC Redevelopment Standards include specific criteria for the implementation of surface water quality improvements. A combination of standard and non-standard practices are proposed and all facilities will treat the required water quality volume from the entire contributing area. Therefore, Water Quality Treatment Options II & III will be utilized. According to Option III of the Redevelopment Standards, alternative or non-standard practices such as manufactured treatment devices are acceptable if they treat 75% of the water quality volume from the disturbed areas as well as any additional runoff directed to the practice. According to Option II, standard practices such as subsurface infiltration systems can be sized to treat the water quality volume generated from 25% of the existing impervious area plus 100% of the new impervious area. Green practices such as green roofs and porous pavement can be used towards credit in meeting the water quality volume requirements.

Proposed standard SMP's will effectively treat 100% of the 1 year storm for all existing and new impervious areas and the proposed alternative SMP's will also treat 100% of the 1 year storm for all existing impervious areas which is above and beyond the water quality requirements for Redevelopment Projects.

Step 3: Runoff Reduction Volumes (RRv) by Applying Green Infrastructure Techniques and Standard SMP's

Green infrastructure techniques or standard SMP's with RRv capacity can potentially reduce the required WQv by incorporating combinations of green infrastructure techniques and standard SMP's within each drainage area on the site.

Green infrastructure techniques are grouped into two categories:

- Practices resulting in a reduction of contributing area such as preservation/restoration of conservation areas, vegetated channels, etc.
- Practices resulting in a reduction of contributing volume such as green roofs, stormwater planters, and rain gardens.

Apply a combination of green infrastructure techniques and standard SMPs with RRv capacity to provide 100% of the WQv calculated in Step 2. If the RRv calculated in this step is greater than or equal to the WQv in Step 2, the RRv requirement has been met and Step 4 can be skipped. If the RRv provided cannot meet or exceed 100% of the WQv, the project must, at a minimum, reduce a percentage of the runoff from impervious areas to be constructed on the site. The percent reduction is based on the Hydrologic Soil Group(s) (HSG) of the site and is defined as Specific Reduction Factor (S).

The following green infrastructure techniques and practices are provided in the Design Manual:

- **Green Roofs**
  - This practice is proposed for the showroom building expansion since that is the only portion of the site that contains new impervious surfaces. An extensive green roof will provide RRv for the Showroom Building Expansion. This proposed green infrastructure technique is well suited and effective to treat the rooftop runoff for this type of project.

- **Standard Practices with RRv Capacity**
  - **Infiltration Practices –** A subsurface infiltration system is proposed to treat and retain runoff from the majority of the site and from the roof area.

<u>Step 4: Apply Standard Stormwater Management Practices & Green Practices to Address Water Quality Volume</u>

- **Infiltration Practices –** A subsurface infiltration system and three drywells are proposed to treat and retain runoff from the majority of the site.

Step 5: Apply Volume and Peak Rate Control Practices to Meet Water Quantity Requirements

The Channel Protection Volume (CPv), Overbank Flood Control (Qp) and Extreme Flood Control (Qf) must be met for the plan to be completed. This is accomplished by using practices such as infiltration basins, dry detention basins, etc. to meet water quantity requirements. The following standards must be met:

1. **Stream Channel Protection (CPv)**

   Stream Channel Protection Volume Requirements (CPv) are designed to protect stream channels from erosion. In New York State this goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event, remained from runoff reduction. Reduction of runoff for meeting stream channel protection objectives, where site conditions allow, is encouraged and the volume reduction achieved through green infrastructure can be deducted from CPv. Trout waters may be exempted from the 24-hour ED requirement, with only 12 hours of extended detention required to meet this criterion. Detention time may be calculated using either a center of mass method or plug flow calculation method.

   - CPv is not required because reduction of the entire CPv volume is achieved at a site through green infrastructure or infiltration systems.
   - CPv for a redevelopment project is not required if there is no increase in impervious area or changes to hydrology that increase the discharge rate. This criterion, as defined in Chapter 4 of New York State Stormwater Design Manual, is not based on a pre versus post-development comparison. However, for a redevelopment project this requirement is relaxed. If the hydrology and hydraulic study shows that the post-construction 1-year 24 hour discharge rate and velocity are less than or equal to the pre-construction discharge rate, providing 24 hour detention of the 1-year storm to meet the channel protection criteria is not required.

2. **Overbank Flood (Qp) which is the 10 year storm.**

Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates.

The overbank flood control requirement (Qp) does not apply in certain conditions, including:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.
- A downstream analysis reveals that overbank control is not needed.
- If redevelopment results in an increase in impervious area or changes to hydrology that increase the discharge rate from the site, the ten year criteria does not apply.

3. **Extreme Storm (Qf) which is the 100 year storm.**
   100 Year Control requires storage to attenuate the post development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates.

   The 100-year storm control requirement can be waived if:

   - The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.
   - Development is prohibited within the ultimate 100-year floodplain
   - A downstream analysis reveals that 100-year control is not needed.
   - If redevelopment results in no increase in impervious area or changes to hydrology that increase the discharge rate from the site the hundred-year criteria does not apply.

Based on the foregoing, this project is eligible for coverage under NYSDEC SPDES General Permit No. GP-0-15-002.

III. STUDY METHODOLOGY

Runoff rates were calculated based upon the standards set forth by the United States Department of Agriculture Natural Resources Conservation Service Technical Release 55, Urban Hydrology for Small Watersheds (TR-55), dated June 1986. The methodology set forth in TR-55 considers a multitude of characteristics for watershed areas including soil types, soil permeability, vegetative cover, time of concentration, topography, rainfall intensity, ponding areas, etc.

The 1, 10, 100 year storm recurrence intervals were reviewed in the design of the stormwater management facilities (see Appendices A & B Existing/Proposed Hydrologic Calculations).

Anticipated drainage conditions were analyzed taking into account the rate of runoff which will result from the construction of buildings, parking areas and other impervious surfaces associated with the site development.

Base Data and Design Criteria

For the stormwater management analysis, the following base information and methodology were used:

1. The site drainage patterns and outfall facilities were reviewed by JMC personnel for the purpose of gathering background data and confirming existing mapping of the watershed areas.

2. An Existing Drainage Area Map was developed from the topographical survey. The drainage area map reflects the existing conditions within and around the project area.

3. A Proposed Drainage Area Map was developed from the architectural design superimposed over the topographical survey. The drainage area map reflects the proposed conditions within the project area and the existing conditions to remain in the surrounding area.

4. The United States Department of Agriculture (USDA) Web Soil Survey of the site available on its website at http://websoilsurvey.nrcd.usda.gov.

5. The United States Department of Agriculture Natural Resources Conservation Service National Engineering Handbook, Section 4 - Hydrology", dated March 1985.

6. The United States Department of Agriculture Natural Resources Conservation Service Technical Report No. 55, Urban Hydrology for Small Watersheds (TR-55), dated June 1986.

7. United States Department of Commerce Weather Bureau Technical Release No. 40 Rainfall Frequency Atlas of the United States.

The time of concentration was calculated using the methods described in Chapter 3 of TR-55, Second Edition, June 1986. Manning's kinematics wave equation was used to determine the travel time of sheet flow. The 2-year 24 hour precipitation amount of 3.42 inches was used in the equation for all storm events. The travel time for shallow concentrated flow was computed using Figure 3-1 and Table 3-1 of TR-55. Manning's Equation was used to determine the travel time for channel reaches.

8. All hydrologic calculations were performed with the Bentley PondPack software package version 8.0.

9. The New York State Stormwater Management Design Manual, revised January 2015.

10. New York Standards and Specifications for Erosion and Sediment Control, August 2005.

11. The storm flows for the 1, 10, and 100 year recurrence interval storms were analyzed for the total watershed areas. The Type III distribution design storm for a 24 hour duration was used and the mass rainfall for each design storm was taken from the Extreme Precipitation in New York & New England developed by the Natural Resource Conservation Service (NRCS) and the Northeast Regional Climate Center (NRCC) as follows:

24 Hour Rainfall Amounts

Design Storm Recurrence Interval	Inches of Rainfall
1 Year	**2.82**
10 Year	**5.06**
100 Year	**8.90**

IV. EXISTING CONDITIONS

The existing conditions of the project site consists of one, two story residential building and one single story residential dwelling adjacent to the north side of Washington Avenue. The site also consists of accessory driveway, patios, retaining walls, concrete slabs, walkways and lawn areas. The site primarily drains from the southeast corner of the lot to the northwest corner.

The following natural features, conservation areas, resource areas and drainage patterns of the project site have been identified and utilized to develop Drawing DA-1 "Existing Drainage Area Map" which is included in Appendix H:

- Forest, vegetative cover
- Topography (contour lines, existing flow paths, steep slopes, etc.)
- Soil (hydrologic soil groups, highly erodible soils, etc.)

Based on the USDA Web soil survey, all on-site soils are classified as Urban land-Riverhead complex, are well drained. The soil types, boundaries and drainage areas/designations are depicted on Drawing DA-1 within Appendix H.

The northwest corner of the site was identified for calculating peak rates of runoff in existing conditions. Similarly, one drainage area (EDA-1) was identified in existing conditions based on the existing drainage divides at the site. The numbers included in the name of each drainage area correspond to the Design Point they drain towards. The following is a description of each of the drainage areas analyzed in the existing conditions analysis:

Existing Drainage Area 1 (EDA-1) is 0.47 acres in size and encompasses the entire site. This area consists of an asphalt driveway, two buildings, sidewalks, lawn, retaining walls, patios, and a small wooded area. This drainage area drains towards the northwest corner of the site. Stormwater runoff from this area flows overland off the site.

The peak rates of runoff to the design points from the drainage areas for each storm are shown in the table below:

Table 1
Summary of Peak Rates of Runoff in Existing Conditions
(Cubic Feet per Second)

Storm Recurrence Interval	DP-1
1 year	0.05
10 year	0.53
100 year	1.75

V. PROPOSED CONDITIONS

The proposed improvements consist of the demolition of all existing features on the site, and the construction of a new 16-unit mews complex with an associated driveway, underground garage, green roofs and courtyard. Under proposed conditions, the site will to drain south towards Washington Avenue and discharge into the existing 15" RCP within Washington Avenue.

The proposed drainage improvements include a variety of stormwater practices, such as green roofs and a subsurface infiltration system.

This section describes the design and analysis of the proposed conditions used to demonstrate that the SWPPP meets the requirements of the General Permit.

The Five Step Process For Stormwater Site Planning and Practice Selection

Step 1: Site Planning

The following practices and site features were incorporated in the site design:

- Preserving hydrology - Maintaining drainage divides
- Reduction of impervious surfaces such as:
  i. New and expanded driveways to be porous pavers.
- Forest, vegetative cover – The maximum amount of forest and vegetative cover has been maintained and/or provided.
- Topography (contour lines, existing flow paths, steep slopes, etc.) has been maintained or disturbed to the minimum extent practicable.
- Soil (hydrologic soil groups, highly erodible soils, etc.)
- Bedrock, significant geology features have been accounted for.

Step 2: Determine Water Quality Treatment Volume (WQv)

According to the New York State Stormwater Design Manual, Section 4.1, the water quality volume is determined from the 90% rule.
Water quality volume required = **1,979 c.f.**

Step 3: Runoff Reduction Volumes (RRv) by Applying Green Infrastructure Techniques and Standard SMP's

- The minimum required RRv is **599 c.f.**
- The provided RRv based on 100% of the required WQv for the drainage area is **2,287 c.f. (529 cf. from green roofs, 1,758 c.f. from infiltration system.)**
- The actual RRv based on the amount of infiltrated volume achieved utilizing the infiltration system is **4,330 c.f.**

Step 4: Apply Standard Stormwater Management Practices to Address Remaining Water Quality Volume

As described in Step 3, the entire water quality volume is addressed by the infiltrations systems and the green roofs.

Step 5: Apply Volume and Peak Rate Control Practices to Meet Water Quantity Requirements

The proposed infiltration system and outlet control structure meet the water quantity requirements for the site by infiltrating the entire 1 year, 24 hour storm.

All practices exceed the required elements of SMP criteria as outlined in Chapter 6 of the NYS Stormwater Management Design Manual. A summary of each category is provided below.

1. Feasibility – Ponds are designed based upon unique physical environmental considerations noted in the NYS Stormwater Management Design Manual (NYSSMDM) Table 7.2 "Physical Feasibility Matrix".

2. Conveyance – The design conveys runoff to the designed infiltration system in a manner that is safe, minimizes erosion and disruption to natural drainage channel and promotes filtering and infiltration.

3. Pretreatment – a hydrodynamic separator will provide pretreatment for all storm water runoff

4. Treatment Geometry – The plan provides water quality treatment in accordance with NYSSMDM guidelines noted Table 6.1 "Water Quality Volume Distributing in Pond Design".

5. Environmental/Landscaping –Extensive landscaping has been provided for each proposed practice to enhance pollutant removal and provide aesthetic enhancement to the property.

6. Maintenance – Maintenance for the environment practices has been provided and is detain the SWPPP Report as required. Maintenance access is provided in the design plans.

In order to determine the post-development rates of runoff generated on-site, the following drainage areas were analyzed in the post-development conditions. These areas are graphically depicted on Drawing DA-2 "Proposed Drainage Area Map" located in Appendix "H".

The southwest corner of the site was identified for calculating peak rates of runoff in proposed conditions. Similarly, one drainage area was identified in proposed conditions based on the

proposed drainage divides at the site. The numbers included in the name of each drainage area correspond to the Design Point they drain towards.

The following is a description of each of the drainage areas analyzed in the proposed conditions analysis:

Proposed Drainage Area 1 (PDA-1) is 0.47 acres in size and consist of the entire site including the 16 townhouse units Mews area, and rooftop patios with an extensive roof system located on the roofs of the East Houses, W-4, W-5 and S-4. The VR-MOD prevegetated hybrid modular vegetated root assembly by Tremco is proposed (see Appendix E). The prevegetated green roof system will provide water quality treatment, slight detention and will discharge runoff through a roof drain system. The proposed green roof will provide hydrologic source control and water quality volume for the roof top runoff. The green roof provides volume reduction which is achieved when runoff is infiltrated to the soil media, and reduced by evapotranspiration. The remaining runoff from the site will be routed to the proposed CULTEC subsurface infiltration system located below the garage floor slab. A total of 42 CULTEC 330XLHD units are proposed for the subsurface infiltration system. Based on the soil testing data and percolation tests that were performed in the field an infiltration rate of six inches per hour was used. A hydrodynamic separator will be used as pretreatment for stormwater runoff before it discharges into to the infiltration system. One Contech CDS 2015-4 unit is proposed.

The peak rates of runoff to the design point of each of the analyzed drainage areas for each storm are shown on the table below

Table 3
Summary of Proposed Peak Rates of Runoff in Proposed Conditions
(Cubic Feet per Second)

Storm Recurrence Interval	DP-1
1 year	0.00
10 year	0.29
100 year	1.66

The reductions in peak rates of runoff from proposed to existing conditions are shown on the table below:

Table 4
Percent Reductions in Peak Rates of Runoff (Existing vs. Proposed Conditions)
(Cubic Feet per Second)

Design Point	Storm Recurrence Frequency (Years)	Existing Peak Runoff Rate (cfs)	Proposed Peak Runoff Rate (cfs)	Percent Reduction (%)
1	1 year	0.05	0.00	100
	10 year	0.53	0.29	45.2
	100 year	1.75	1.66	5.1

As demonstrated in Table 4, the proposed stormwater improvements will result in reductions of peak rates of runoff for all storms at the design point analyzed.

VI. SOIL EROSION & SEDIMENT CONTROL

A potential impact of the proposed development on any soils or slopes will be that of erosion and transport of sediment during construction. An Erosion and Sediment Control Management Program will be established for the proposed development, beginning at the start of construction and continuing throughout its course, as outlined in the "New York State Standards and Specifications for Erosion and Sediment Control," dated August 2005. A continuing maintenance

program will be implemented for the control of sediment transport and erosion control after construction and throughout the useful life of the project.

The Operator shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify that the appropriate erosion and sediment controls, as shown on the Sediment & Erosion Control Plans, have been adequately installed to ensure overall preparedness of the site for the commencement of construction. In addition, the Operator shall have a qualified professional conduct one site inspection at least every seven calendar days and at least two site inspections every seven calendar days when greater than five acres of soil is disturbed at any one time.

Prior to the commencement of construction activity, the owner or operator must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The owner or operator shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the trained contractor. The owner or operator shall ensure that at least one trained contractor is on site on a daily basis when soil disturbance activities are being performed.
The owner or operator shall have each of the contractors and subcontractors identified above sign a copy of the certification statement provided.

Soil Description

As provided by the United States Department of Agriculture, Soil Conservation Service "Web Soil Survey," soil classifications which exist on the subject site are described below.

Soils are placed into four hydrologic groups: A, B, C, and D. In the definitions of the classes, infiltration rate is the rate at which water enters the soil at the surface and is controlled by the surface conditions. Transmission rate is the rate at which water moves in the soil and is controlled by soil properties. Definitions of the classes are as follows:

A. (Low runoff potential). The soils have a high infiltration rate even when thoroughly wetted. They chiefly consist of deep, well drained to excessively drained sands or gravels. They have a high rate of water transmission.

B. The soils have a moderate infiltration rate when thoroughly wetted. They chiefly are moderately deep to deep, moderately well drained to well drained soils that have moderately fine to moderately coarse textures. They have a moderate rate of water transmission.

C. The soils have a slow infiltration rate when thoroughly wetted. They chiefly have a layer that impedes downward movement of water or have moderately fine to fine texture. They have a slow rate of water transmission.

D. (High runoff potential). The soils have a very slow infiltration rate when thoroughly wetted. They chiefly consist of clay soils that have a high swelling potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. They have a very slow rate of water transmission.

A soil's tendency to erode is also described in the USDA web soil survey. The ratings in this interpretation indicate the hazard of soil loss from unsurfaced areas. The ratings are based on soil erosion factor K, slope, and content of rock fragments. The hazard is described as "slight," "moderate," or "SEVERE." A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the temporarily unsurfaced / unstabilized during construction may require occasional maintenance, and that simple erosion-control measures are needed; and "SEVERE" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that erosion-control measures are needed.

Per the Soil Survey, the following soils listed below are present at the site. Following this list is a detailed description of each soil type found on the property:

SYM.	HYDRO. SOIL GROUP	DESCRIPTION
RhE	**A**	**Riverhead Loam, 25-50% slopes**

This soil consists of loam, sandy loam, and loamy sand. It is composed of 50% urban land, 25% riverhead and similar soils, and 25% minor components. Depth to the top of a seasonal high water table is greater than 80 inches.
Hydrologic group: A
Erosion Hazard Rating: NOT RATED

On-Site Pollution Prevention

There are temporary pollution prevention measures used to control litter and construction debris on site, such as:

- Silt Fence
- Silt Sack
- Excavated Drop Inlet Protection
- Curb Drop Inlet Protection

There will be inlet protection provided for all storm drains and inlets with the use of curb gutter inlet protection structures and stone & block drop inlet protection, which keep silt, sediment and construction litter and debris out of the on-site stormwater drainage system.

Temporary Control Measures

Temporary control measures and facilities will include silt fences, stabilized construction entrances, and inlet protection.

Throughout the construction of the proposed redevelopment temporary control facilities will be implemented to control on-site erosion and sediment transfer. Interceptor swales, if required, will be used to direct stormwater runoff to temporary sediment traps for settlement. The sediment traps

will be constructed as part of this project will serve as temporary sediment basins to remove sediment and pollutants from the stormwater runoff produced during construction. Descriptions of the temporary sediment & erosion controls that will be used during the development of the site including silt fence, stabilized construction entrance and inlet protection are as follows:

1. Silt Fence is constructed using a geotextile fabric. The fence will be either 18 inches or 30 inches high. The height of the fence can be increased in the event of placing these devices on uncompacted fills or extremely loose undisturbed soils. The fences will not be placed in areas which receive concentrated flows such as ditches, swales and channels nor will the filter fabric material be placed across the entrance to pipes, culverts, spillway structures, sediment traps or basins.

2. Stabilized Construction Entrance consists of AASHTO No. 1 rock. The rock entrance will be a minimum of 50 feet in length by 20 feet in width by 8 inches in depth.

3. Inlet Protection will be provided for all stormwater basins and inlets with the use of curb & gutter inlet protection and stone & block inlet protection structures, which will keep silt, sediment and construction debris out of the storm system. Existing structures within existing paved areas will be protected using “Silt Sacks” inside the structures.

The contractor shall be responsible for maintaining the temporary sediment and erosion control measures throughout construction. This maintenance will include, but not be limited to, the following tasks:

1. For dust control purposes, moisten all exposed graded areas with water at least twice a day in those areas where soil is exposed and cannot be planted with a temporary cover due to construction operations or the season (December through March).

2. Inspection of erosion and sediment control measures shall be performed at the end of each construction day and immediately following each rainfall event. All required repairs shall be immediately executed by the contractor.

3. Sediment deposits shall be removed when they reach approximately ⅓ the height of the silt fence. All such sediment shall be properly disposed of in fill areas on the site, as directed by the Owner's Field Representative. Fill shall be protected following disposal with mulch, temporary and/or permanent vegetation and be completely circumscribed on the downhill side by silt fence.

4. Rake all exposed areas parallel to the slope during earthwork operations.

5. Following final grading, the disturbed area shall be stabilized with a permanent surface treatment (i.e. turf grass, pavement or sidewalk). During rough grading, areas which are not to be disturbed for fourteen or more days shall be stabilized with the temporary seed mixture, as defined on the plans. Seed all piles of dirt in exposed soil areas that will not receive a permanent surface treatment.

Concrete Material and Equipment Management

Concrete washouts shall be used to contain concrete and liquids when the chutes of concrete mixers and hoppers of concrete pumps are rinsed out after delivery. The washout facilities consolidate solid for easier disposal and prevent runoff of liquids. The wash water is alkaline and contains high levels of chromium, which can leach into the ground and contaminate groundwater. It can also migrate to a storm drain, which can increase the pH of area waters and harm aquatic life. Solids that are improperly disposed of can clog storm drain pipes and cause flooding. Installing concrete washout facilities not only prevents pollution but also is a matter of good housekeeping at your construction site.

Prefabricated concrete washout containers can be delivered to the site to provide maintenance and disposal of materials. Regular pick-ups of solid and liquid waste materials will be necessary. To

prevent leaks on the job site, ensure that prefabricated washout containers are watertight. A self installed concrete washout facility can be utilized although they are much less reliable than prefabricated containers and are prone to leaks. There are many design options for the washout, but they are preferably built below-grade to prevent breaches and reduce the likelihood of runoff. Above-grade structures can also be used if they are sized and constructed correctly and are diligently maintained. One of the most common problems with self-installed concrete washout facilities is that they can leak or be breached as a result of constant use, therefore the contractor shall be sure to use quality materials and inspect the facilities on a daily basis.

Washouts must be sized to handle solids, wash water, and rainfall to prevent overflow. Concrete Washout Systems, Inc. estimates that 7 gallons of wash water are used to wash one truck chute and 50 gallons are used to wash out the hopper of a concrete pump truck.

For larger sites, a below-grade washout should be at least 10 feet wide and sized to contain all liquid and solid waste expected to be generated in between cleanout periods. A minimum of 12-inches of freeboard must be provided. The pit must be lined with plastic sheeting of at least 10-mil thickness without holes or tears to prevent leaching of liquids into the ground. Concrete wash water should never be placed in a pit that is connected to the storm drain system or that drains to nearby waterways.

An above-grade washout can be constructed at least 10 feet wide by 10 feet long and sized to contain all liquid and solid waste expected to be generated in between cleanout periods. A minimum of 4-inches of freeboard must be provided. The washout structures can be constructed with staked straw bales or sandbags double-or triple lined with plastic sheeting of at least 10-mil thickness without holes or tears.

Concrete washout facilities shall not be located within 50 feet of storm drains, open ditches, or water bodies and should be placed in locations that allow for convenient access for concrete trucks. The contractor shall check all concrete washout facilities daily to determine if they have been filled to 75 percent capacity, which is when materials need to be removed. Both above-and below-ground self-installed washouts should be inspected daily to ensure that plastic linings are

intact and sidewalls have not been damaged by construction activities. Prefabricated washout containers should be inspected daily as well as to ensure the container is not leaking or nearing 75 percent capacity. Inspectors should also note whether the facilities are being used regularly. Additional signage for washouts may be needed in more convenient locations if concrete truck operators are not utilizing them.

The washout structures must be drained or covered prior to predicted rainstorms to prevent overflows. Hardened solids either whole or broken must be removed and then they may be reused onsite or hauled away for recycling.

Once materials are removed from the concrete washout, a new structure must be built or excavated, or if the previous structure is still intact, inspect it for signs of weakening or damage and make any necessary repairs. Line the structure with new plastic that is free of holes or tears and replace signage if necessary. It is very important that new plastic be used after every cleaning because pumps and concrete removal equipment can damage the existing liner.

Construction Site Chemical Control

The purpose of this management measure is to prevent the generation of nonpoint source pollution from construction sites due to improper handling and usage of nutrients and toxic substances, and to prevent the movement of toxic substances from the construction site.

Many potential pollutants other than sediment are associated with construction activities. These pollutants include pesticides; fertilizers used for vegetative stabilization; petrochemicals; construction chemicals such as concrete products, sealers, and paints; wash water associated with these products; paper; wood; garbage; and sanitary waste.

Disposal of excess pesticides and pesticide-related wastes should conform to registered label directions for the disposal and storage of pesticides and pesticide containers set forth in applicable Federal, State and local regulations that govern their usage, handling, storage, and disposal.

Pesticides should be disposed of through either a licensed waste management firm or a treatment, storage and disposal (TSD) facility. Containers should be triple-rinsed before disposal, and rinse waters should be reused as product.

Other practices include setting aside a locked storage area, tightly closing lids, storing in a cool, dry place, checking containers periodically for leaks or deterioration, maintaining a list of products in storage, using plastic sheeting to line the storage areas, and notifying neighboring property owners prior to spraying.

When storing petroleum products, follow these guidelines:

- Create a shelter around the area with cover and wind protection;
- Line the storage area with a double layer of plastic sheeting or similar material;
- Create an impervious berm around the perimeter with a capacity of 110 percent greater than that of the largest container;
- Clearly label all products;
- Keep tanks off the ground; and
- Keep lids securely fastened.

Post spill procedure information and have persons trained in spill handling on site or on call at all times. Materials for cleaning up spills should be kept on site and easily available. Spills should be cleaned up immediately and the contaminated material properly disposed of. Maintain and wash equipment and machinery in confined areas specifically designed to control runoff.

Thinners or solvents should not be discharged into sanitary or storm systems when cleaning machinery. Use alternative methods for cleaning larger equipment parts, such as high-pressure, high-temperature water washes, or steam cleaning. Equipment-washing detergents can be used, and wash water may be discharged into sanitary sewers if solids are removed from the solution first. (This practice should be verified with the local sewer authority.) Small parts can be cleaned with degreasing solvents, which can then be reused or recycled.

Solid Waste Management and Portable Sanitary Management

The purpose of this management measure is to prevent the potential for solid waste such as construction debris, trash, etc. from construction sites due to improper handling and storage. Debris and litter should be removed periodically from the BMP's and surrounding areas to prevent clogging of pipes and structures. All construction material shall be stored in designated staging areas. Roll-off containers shall be placed on site and all empty containers, construction debris and litter shall be placed in the containers.

Portable sanitary units may be utilized on-site or bathrooms will be provided within construction trailers. A sanitation removal company will be hired to pump/remove any sanitary waste. In the event that portable sanitary units are used and then cleaned after being emptied, the rinse water may not be disposed of to the storm drain system. It shall be contained for later disposal if it can't be disposed of on-site. Remove paper and trash before cleaning the portable sanitary units. The portable sanitary units shall be located away from the storm drain system if possible. Provide over head cover for wash areas if possible. Maintain spill response material and equipment on site to eliminate the potential for contaminants and wash water from entering the storm drain system.

Permanent Control Measures and Facilities for Long Term Protection

Towards the completion of construction, permanent sediment and erosion control measures will be developed for long term erosion protection. The following permanent control measures and facilities have been proposed to be implemented for the project:

1. CDS Water Quality Structure will be used to provide pretreatment of the water quality flow rate for separating sediment, debris, floatables, etc. from the runoff prior to discharge to the SMP's.

2. Infiltration System (I-2) which is a standard SMP that will be used to treat the runoff volume generated from a portion of the developed area and provide additional water quality and runoff volume reduction. The smaller storms will be retained and the higher storms will be released gradually. Refer to the Proposed Hydrologic Calculations and Runoff Reduction and Water Quality Volume Sizing Calculations, in Appendices B and C.

The Cultec 330XLHD Recharge Chambers are domed shaped fully opened bottom corrugated chambers with perforated side walls. Chambers allow stormwater to be stored within the dome void until it can infiltrate into the ground. They are able to be used for residential, commercial or industrial applications and provide an easy way to treat and dispose of stormwater runoff underground. Water is infiltrated into the ground through the chambers and surrounding crushed stone and will replenish the groundwater as a natural condition.

3. Catch Basins will be used to remove some of the coarse sand and grit sediment before entering the drainage system. Each catch basin will be constructed with an 18 inch deep sump.

VII. CONSTRUCTION PHASE AND POST-CONSTRUCTION MAINTENANCE

During the construction phase and following construction of the project, a number of maintenance measures will be taken with respect to the site maintenance. Measures to be taken included the following:

1. During Construction

A comprehensive sediment and erosion control plan will be in place during the construction period. Maintenance measures for sediment and erosion controls will include:

A qualified professional acceptable to the municipality will be hired by the owner or operator to monitor the installation and maintenance of the sediment and erosion control plans. The qualified professional shall report directly to the Engineering Consultant and shall be responsible for ensuring compliance with the design of the sediment and erosion control plans.

The qualified professional so hired will inspect all sediment and erosion control measures at least every seven calendar days. In the event that there has been a variance with the design of the sediment and erosion control measures so that the ability of the measures to adequately perform the intended function is lessened or compromised and/or the facilities are not adequately

maintained, the qualified professional shall be required to report such variance to the Engineering Consultant within 48 hours and shall be empowered to order immediate repairs to the sediment and erosion control measures.

The qualified professional will also be responsible for observing the adequacy of the vegetation growth (trees, shrubs, groundcovers and turfgrasses) in newly graded areas and for ordering additional plantings in the event that the established plant materials do not adequately protect the ground surface from erosion.

2. Following Construction

Site maintenance activities on the property will include:

- Grounds maintenance, including mowing of lawns;
- Planting of trees, shrubs and groundcovers; pruning of trees and shrubs;
- Application of fertilizer and herbicides;
- Maintenance of stormwater management area;

Grounds maintenance on the site will be performed by landscaping contractor.

Fertilizer is typically applied twice in the year - once in the spring and once in the fall. The application of fertilizer is usually necessary to maintain healthy lawn growth due to competition for nutrients with trees and shrubs and since the clippings are often removed. It is not recommended that fertilizer be applied during the summer. It is at this time that lawns are typically dormant.

Fertilizers come in three basic types: (1) Organic; (2) Soluble synthetic and (3) Slow release.

Organic fertilizers are derived from plant or animal waste. Since they are heavier and bulkier than other fertilizers, it is necessary to apply a much greater amount at one time. Soluble synthetic fertilizers are predictable with determining the exact impact on a lawn. However more

applications are necessary since their effect is often short term. Slow release fertilizers have a high percentage of nitrogen so quantities that need be handled at one time are smaller. Slow release fertilizers will be utilized by the project.

A complete fertilizer contains all three of the primary nutrients - nitrogen (N), phosphorus (P) and potassium in the form of potash (K). Typically, a 3-1-2 ratio of nutrients (N-P-K) is used for lawn applications.

Fertilizer shall be applied by the landscape contractor in accordance with the manufacturer's instructions. The application of fertilizer does require some skill on the part of the operator. Should there be a spill of fertilizer, the landscape contractor shall be required to scrape or vacuum it up. The area will then be watered in accordance with the manufacturer's instructions to ensure that the fertilizer becomes soluble and available to plants and does not run off.

Owner will be responsible for the long-term operation and maintenance of the permanent stormwater management practices. The permanent stormwater management practices shall be maintained in accordance with the Maintenance Inspection Checklists provided in Appendix G.

VIII. CONCLUSION

This Stormwater Pollution Prevention Plan has been prepared to describe the project's pre and post-development stormwater management improvements and its sediment and erosion control improvements to be utilized during construction. The proposed permanent improvements and the interim improvements to be utilized during construction have been designed in accordance with the requirements of the:

- Chapter 250 "Stormwater Management, Erosion and Water Pollution Control" of the Hastings-on-Hudson Zoning Code.
- New York State Stormwater Management Design Manual.

The project employs a variety of practices to enhance stormwater quality and reduce peak rates of runoff associated with the proposed improvements. These measures include porous pavers, dry wells, and subsurface stormwater management/infiltration chambers. These improvements will also mitigate runoff volumes from the proposed improvements as runoff volumes will be slightly reduced or maintained in all the analyzed storms.

Based on the foregoing, it is our professional opinion that the proposed improvements will provide water quantity and quality enhancements which exceed the above mentioned requirements and are not anticipated to have any adverse impacts to the site or any surrounding areas.

WASHINGTON MEWS

WASHINGTON AVE — HASTINGS-ON-HUDSON

SITE LOCATION MAP

DATE: 11/05/2015 — JMC PROJECT: 15207

FIGURE: SLM-1 — SCALE: 1" = 1,000'

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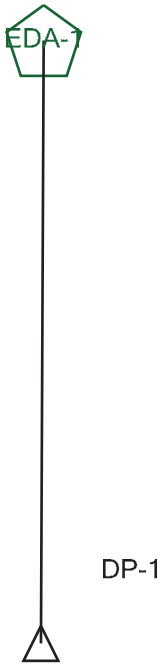
APPENDIX A

EXISTING HYDROLOGIC CALCULATIONS

Scenario: Westchester-JMC - Synthetic Curve, 1 yrs



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WASHINGTON MEWS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
EDA-1	Westchester-JMC - Synthetic Curve, 1 yrs	1	0.010	12.350	0.05
EDA-1	Westchester-JMC - Synthetic Curve, 10 yrs	10	0.050	12.150	0.53
EDA-1	Westchester-JMC - Synthetic Curve, 100 yrs	100	0.155	12.150	1.77

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
DP-1	Westchester-JMC - Synthetic Curve, 1 yrs	1	0.010	12.350	0.05
DP-1	Westchester-JMC - Synthetic Curve, 10 yrs	10	0.050	12.150	0.53
DP-1	Westchester-JMC - Synthetic Curve, 100 yrs	100	0.155	12.150	1.77

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Time-Depth Curve: TypeIII 24hr (2.8 in)	
Label	TypeIII 24hr (2.8 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.0	0.0	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.1	0.1	0.1
4.500	0.1	0.1	0.1	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.2	0.2
6.500	0.2	0.2	0.2	0.2	0.2
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.3	0.3	0.3
8.000	0.3	0.3	0.3	0.3	0.4
8.500	0.4	0.4	0.4	0.4	0.4
9.000	0.4	0.4	0.4	0.4	0.5
9.500	0.5	0.5	0.5	0.5	0.5
10.000	0.5	0.5	0.6	0.6	0.6
10.500	0.6	0.6	0.6	0.7	0.7
11.000	0.7	0.7	0.8	0.8	0.8
11.500	0.8	0.9	1.0	1.1	1.2
12.000	1.4	1.6	1.8	1.9	1.9
12.500	2.0	2.0	2.0	2.1	2.1
13.000	2.1	2.1	2.2	2.2	2.2
13.500	2.2	2.2	2.2	2.3	2.3
14.000	2.3	2.3	2.3	2.3	2.3
14.500	2.4	2.4	2.4	2.4	2.4
15.000	2.4	2.4	2.4	2.4	2.4
15.500	2.5	2.5	2.5	2.5	2.5
16.000	2.5	2.5	2.5	2.5	2.5

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	2.5	2.5	2.5	2.6	2.6
17.000	2.6	2.6	2.6	2.6	2.6
17.500	2.6	2.6	2.6	2.6	2.6
18.000	2.6	2.6	2.6	2.6	2.6
18.500	2.6	2.6	2.6	2.7	2.7
19.000	2.7	2.7	2.7	2.7	2.7
19.500	2.7	2.7	2.7	2.7	2.7
20.000	2.7	2.7	2.7	2.7	2.7
20.500	2.7	2.7	2.7	2.7	2.7
21.000	2.7	2.7	2.7	2.7	2.7
21.500	2.8	2.8	2.8	2.8	2.8
22.000	2.8	2.8	2.8	2.8	2.8
22.500	2.8	2.8	2.8	2.8	2.8
23.000	2.8	2.8	2.8	2.8	2.8
23.500	2.8	2.8	2.8	2.8	2.8
24.000	2.8	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Time-Depth Curve: TypeIII 24hr (5.1 in)	
Label	TypeIII 24hr (5.1 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.3	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.3	0.3	0.3	0.4
6.000	0.4	0.4	0.4	0.4	0.4
6.500	0.4	0.4	0.4	0.4	0.4
7.000	0.5	0.5	0.5	0.5	0.5
7.500	0.5	0.5	0.5	0.6	0.6
8.000	0.6	0.6	0.6	0.6	0.6
8.500	0.6	0.7	0.7	0.7	0.7
9.000	0.7	0.8	0.8	0.8	0.8
9.500	0.8	0.9	0.9	0.9	0.9
10.000	1.0	1.0	1.0	1.0	1.1
10.500	1.1	1.1	1.2	1.2	1.2
11.000	1.3	1.3	1.3	1.4	1.4
11.500	1.5	1.6	1.7	1.9	2.1
12.000	2.5	3.0	3.2	3.3	3.5
12.500	3.6	3.6	3.7	3.7	3.8
13.000	3.8	3.8	3.9	3.9	3.9
13.500	4.0	4.0	4.0	4.1	4.1
14.000	4.1	4.1	4.2	4.2	4.2
14.500	4.2	4.2	4.3	4.3	4.3
15.000	4.3	4.3	4.4	4.4	4.4
15.500	4.4	4.4	4.4	4.5	4.5
16.000	4.5	4.5	4.5	4.5	4.5

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	4.5	4.6	4.6	4.6	4.6
17.000	4.6	4.6	4.6	4.6	4.6
17.500	4.7	4.7	4.7	4.7	4.7
18.000	4.7	4.7	4.7	4.7	4.7
18.500	4.7	4.7	4.8	4.8	4.8
19.000	4.8	4.8	4.8	4.8	4.8
19.500	4.8	4.8	4.8	4.8	4.8
20.000	4.8	4.8	4.9	4.9	4.9
20.500	4.9	4.9	4.9	4.9	4.9
21.000	4.9	4.9	4.9	4.9	4.9
21.500	4.9	4.9	4.9	5.0	5.0
22.000	5.0	5.0	5.0	5.0	5.0
22.500	5.0	5.0	5.0	5.0	5.0
23.000	5.0	5.0	5.0	5.0	5.0
23.500	5.0	5.0	5.0	5.1	5.1
24.000	5.1	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Time-Depth Curve: TypeIII 24hr (8.9 in)	
Label	TypeIII 24hr (8.9 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.1	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.2	0.2	0.2
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.3	0.3
3.000	0.3	0.3	0.3	0.3	0.3
3.500	0.3	0.3	0.3	0.4	0.4
4.000	0.4	0.4	0.4	0.4	0.4
4.500	0.4	0.5	0.5	0.5	0.5
5.000	0.5	0.5	0.5	0.5	0.6
5.500	0.6	0.6	0.6	0.6	0.6
6.000	0.6	0.7	0.7	0.7	0.7
6.500	0.7	0.7	0.8	0.8	0.8
7.000	0.8	0.8	0.8	0.9	0.9
7.500	0.9	0.9	0.9	1.0	1.0
8.000	1.0	1.0	1.1	1.1	1.1
8.500	1.1	1.2	1.2	1.2	1.3
9.000	1.3	1.3	1.4	1.4	1.4
9.500	1.5	1.5	1.6	1.6	1.6
10.000	1.7	1.7	1.8	1.8	1.9
10.500	1.9	2.0	2.0	2.1	2.2
11.000	2.2	2.3	2.4	2.5	2.6
11.500	2.7	2.8	3.0	3.3	3.7
12.000	4.5	5.2	5.6	5.9	6.1
12.500	6.2	6.3	6.4	6.5	6.6
13.000	6.7	6.7	6.8	6.9	6.9
13.500	7.0	7.0	7.1	7.1	7.2
14.000	7.2	7.3	7.3	7.3	7.4
14.500	7.4	7.5	7.5	7.5	7.6
15.000	7.6	7.6	7.7	7.7	7.7
15.500	7.8	7.8	7.8	7.8	7.9
16.000	7.9	7.9	7.9	8.0	8.0

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	8.0	8.0	8.0	8.1	8.1
17.000	8.1	8.1	8.1	8.1	8.2
17.500	8.2	8.2	8.2	8.2	8.2
18.000	8.3	8.3	8.3	8.3	8.3
18.500	8.3	8.3	8.4	8.4	8.4
19.000	8.4	8.4	8.4	8.4	8.4
19.500	8.5	8.5	8.5	8.5	8.5
20.000	8.5	8.5	8.5	8.6	8.6
20.500	8.6	8.6	8.6	8.6	8.6
21.000	8.6	8.6	8.6	8.7	8.7
21.500	8.7	8.7	8.7	8.7	8.7
22.000	8.7	8.7	8.7	8.8	8.8
22.500	8.8	8.8	8.8	8.8	8.8
23.000	8.8	8.8	8.8	8.8	8.9
23.500	8.9	8.9	8.9	8.9	8.9
24.000	8.9	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time of Concentration Calculations
Label: EDA-1

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	150.00 ft
Manning's n	0.240
Slope	0.133 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.28 ft/s
Segment Time of Concentration	0.149 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.149 hours

= = = = SCS Channel Flow

Tc =

R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

Subsection: Time of Concentration Calculations
Label: EDA-1

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	150.00 ft
Manning's n	0.240
Slope	0.133 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.28 ft/s
Segment Time of Concentration	0.149 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.149 hours

= = = = SCS Channel Flow

Tc =

R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

Subsection: Time of Concentration Calculations
Label: EDA-1

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	150.00 ft
Manning's n	0.240
Slope	0.133 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.28 ft/s
Segment Time of Concentration	0.149 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.149 hours

= = = = SCS Channel Flow

Tc =

R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

Subsection: Runoff CN-Area
Label: EDA-1

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
IMPERVIOUS	98.000	0.162	0.0	0.0	98.000
LAWN	39.000	0.314	0.0	0.0	39.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.476	(N/A)	(N/A)	59.080

Subsection: Runoff CN-Area
Label: EDA-1

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
IMPERVIOUS	98.000	0.162	0.0	0.0	98.000
LAWN	39.000	0.314	0.0	0.0	39.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.476	(N/A)	(N/A)	59.080

Subsection: Runoff CN-Area
Label: EDA-1

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
IMPERVIOUS	98.000	0.162	0.0	0.0	98.000
LAWN	39.000	0.314	0.0	0.0	39.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.476	(N/A)	(N/A)	59.080

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 1 years
Label: EDA-1 Storm Event: TypeIII 24hr (2.8 in)

Storm Event	TypeIII 24hr (2.8 in)
Return Event	1 years
Duration	35.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.149 hours
Area (User Defined)	0.476 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
12.000	0.00	0.00	0.01	0.03	0.04
12.250	0.05	0.05	0.05	0.05	0.05
12.500	0.04	0.03	0.03	0.03	0.02
12.750	0.02	0.02	0.02	0.02	0.02
13.000	0.02	0.02	0.02	0.02	0.02
13.250	0.02	0.02	0.02	0.02	0.02
13.500	0.02	0.02	0.02	0.02	0.02
13.750	0.02	0.02	0.02	0.02	0.02
14.000	0.01	0.01	0.01	0.01	0.01
14.250	0.01	0.01	0.01	0.01	0.01
14.500	0.01	0.01	0.01	0.01	0.01
14.750	0.01	0.01	0.01	0.01	0.01
15.000	0.01	0.01	0.01	0.01	0.01
15.250	0.01	0.01	0.01	0.01	0.01
15.500	0.01	0.01	0.01	0.01	0.01
15.750	0.01	0.01	0.01	0.01	0.01
16.000	0.01	0.01	0.01	0.01	0.01
16.250	0.01	0.01	0.01	0.01	0.01
16.500	0.01	0.01	0.01	0.01	0.01
16.750	0.01	0.01	0.01	0.01	0.01
17.000	0.01	0.01	0.01	0.01	0.01
17.250	0.01	0.01	0.01	0.01	0.01
17.500	0.01	0.01	0.01	0.01	0.01
17.750	0.01	0.01	0.01	0.01	0.01
18.000	0.01	0.01	0.01	0.01	0.01
18.250	0.01	0.01	0.01	0.01	0.01
18.500	0.01	0.01	0.01	0.01	0.01
18.750	0.01	0.01	0.01	0.01	0.01
19.000	0.01	0.01	0.01	0.01	0.01
19.250	0.01	0.01	0.01	0.01	0.01
19.500	0.01	0.01	0.01	0.01	0.01
19.750	0.01	0.01	0.01	0.01	0.01

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 1 years
Label: EDA-1 Storm Event: TypeIII 24hr (2.8 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
20.000	0.01	0.01	0.01	0.01	0.01
20.250	0.01	0.01	0.01	0.01	0.01
20.500	0.01	0.00	0.00	0.00	0.00
20.750	0.00	0.00	0.00	0.00	0.00
21.000	0.00	0.00	0.00	0.00	0.00
21.250	0.00	0.00	0.00	0.00	0.00
21.500	0.00	0.00	0.00	0.00	0.00
21.750	0.00	0.00	0.00	0.00	0.00
22.000	0.00	0.00	0.00	0.00	0.00
22.250	0.00	0.00	0.00	0.00	0.00
22.500	0.00	0.00	0.00	0.00	0.00
22.750	0.00	0.00	0.00	0.00	0.00
23.000	0.00	0.00	0.00	0.00	0.00
23.250	0.00	0.00	0.00	0.00	0.00
23.500	0.00	0.00	0.00	0.00	0.00
23.750	0.00	0.00	0.00	0.00	0.00
24.000	0.00	0.00	0.00	0.00	(N/A)

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: EDA-1 Storm Event: TypeIII 24hr (5.1 in)

Storm Event	TypeIII 24hr (5.1 in)
Return Event	10 years
Duration	35.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.149 hours
Area (User Defined)	0.476 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
11.400	0.00	0.00	0.00	0.01	0.01
11.650	0.02	0.03	0.04	0.06	0.08
11.900	0.11	0.17	0.27	0.39	0.49
12.150	0.53	0.48	0.41	0.36	0.33
12.400	0.29	0.26	0.22	0.18	0.15
12.650	0.13	0.12	0.11	0.11	0.10
12.900	0.10	0.09	0.09	0.09	0.08
13.150	0.08	0.08	0.08	0.08	0.08
13.400	0.07	0.07	0.07	0.07	0.07
13.650	0.07	0.07	0.07	0.07	0.06
13.900	0.06	0.06	0.06	0.06	0.06
14.150	0.06	0.06	0.06	0.06	0.06
14.400	0.05	0.05	0.05	0.05	0.05
14.650	0.05	0.05	0.05	0.05	0.05
14.900	0.05	0.05	0.05	0.05	0.05
15.150	0.05	0.05	0.04	0.04	0.04
15.400	0.04	0.04	0.04	0.04	0.04
15.650	0.04	0.04	0.04	0.04	0.04
15.900	0.04	0.04	0.03	0.03	0.03
16.150	0.03	0.03	0.03	0.03	0.03
16.400	0.03	0.03	0.03	0.03	0.03
16.650	0.03	0.03	0.03	0.03	0.03
16.900	0.03	0.03	0.03	0.03	0.03
17.150	0.03	0.03	0.03	0.03	0.03
17.400	0.03	0.03	0.02	0.02	0.02
17.650	0.02	0.02	0.02	0.02	0.02
17.900	0.02	0.02	0.02	0.02	0.02
18.150	0.02	0.02	0.02	0.02	0.02
18.400	0.02	0.02	0.02	0.02	0.02
18.650	0.02	0.02	0.02	0.02	0.02
18.900	0.02	0.02	0.02	0.02	0.02
19.150	0.02	0.02	0.02	0.02	0.02

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: EDA-1 Storm Event: TypeIII 24hr (5.1 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
19.400	0.02	0.02	0.02	0.02	0.02
19.650	0.02	0.02	0.02	0.02	0.02
19.900	0.02	0.02	0.02	0.02	0.02
20.150	0.02	0.02	0.02	0.02	0.02
20.400	0.02	0.02	0.02	0.02	0.02
20.650	0.02	0.02	0.02	0.02	0.02
20.900	0.02	0.02	0.02	0.02	0.02
21.150	0.02	0.02	0.02	0.02	0.02
21.400	0.02	0.02	0.02	0.02	0.02
21.650	0.02	0.02	0.02	0.02	0.02
21.900	0.02	0.01	0.01	0.01	0.01
22.150	0.01	0.01	0.01	0.01	0.01
22.400	0.01	0.01	0.01	0.01	0.01
22.650	0.01	0.01	0.01	0.01	0.01
22.900	0.01	0.01	0.01	0.01	0.01
23.150	0.01	0.01	0.01	0.01	0.01
23.400	0.01	0.01	0.01	0.01	0.01
23.650	0.01	0.01	0.01	0.01	0.01
23.900	0.01	0.01	0.01	0.01	0.01
24.150	0.00	0.00	0.00	(N/A)	(N/A)

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: EDA-1 Storm Event: TypeIII 24hr (8.9 in)

Storm Event	TypeIII 24hr (8.9 in)
Return Event	100 years
Duration	35.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.149 hours
Area (User Defined)	0.476 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
9.400	0.00	0.00	0.00	0.00	0.00
9.650	0.01	0.01	0.01	0.01	0.01
9.900	0.01	0.01	0.01	0.01	0.02
10.150	0.02	0.02	0.02	0.02	0.02
10.400	0.03	0.03	0.03	0.03	0.04
10.650	0.04	0.04	0.04	0.05	0.05
10.900	0.05	0.05	0.06	0.06	0.06
11.150	0.07	0.07	0.08	0.09	0.10
11.400	0.10	0.11	0.12	0.14	0.16
11.650	0.20	0.26	0.33	0.41	0.50
11.900	0.61	0.79	1.15	1.49	1.73
12.150	1.77	1.54	1.28	1.09	0.96
12.400	0.84	0.73	0.61	0.51	0.42
12.650	0.36	0.33	0.31	0.29	0.28
12.900	0.27	0.25	0.24	0.23	0.22
13.150	0.21	0.21	0.20	0.20	0.20
13.400	0.19	0.19	0.19	0.18	0.18
13.650	0.18	0.18	0.17	0.17	0.17
13.900	0.16	0.16	0.16	0.15	0.15
14.150	0.15	0.15	0.14	0.14	0.14
14.400	0.14	0.14	0.14	0.13	0.13
14.650	0.13	0.13	0.13	0.13	0.12
14.900	0.12	0.12	0.12	0.12	0.12
15.150	0.11	0.11	0.11	0.11	0.11
15.400	0.11	0.10	0.10	0.10	0.10
15.650	0.10	0.10	0.09	0.09	0.09
15.900	0.09	0.09	0.09	0.08	0.08
16.150	0.08	0.08	0.08	0.08	0.08
16.400	0.08	0.08	0.08	0.08	0.07
16.650	0.07	0.07	0.07	0.07	0.07
16.900	0.07	0.07	0.07	0.07	0.07
17.150	0.07	0.07	0.06	0.06	0.06

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: EDA-1 Storm Event: TypeIII 24hr (8.9 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
17.400	0.06	0.06	0.06	0.06	0.06
17.650	0.06	0.06	0.06	0.06	0.06
17.900	0.05	0.05	0.05	0.05	0.05
18.150	0.05	0.05	0.05	0.05	0.05
18.400	0.05	0.05	0.05	0.05	0.05
18.650	0.05	0.05	0.05	0.05	0.05
18.900	0.05	0.05	0.05	0.05	0.05
19.150	0.05	0.05	0.05	0.05	0.05
19.400	0.05	0.05	0.04	0.04	0.04
19.650	0.04	0.04	0.04	0.04	0.04
19.900	0.04	0.04	0.04	0.04	0.04
20.150	0.04	0.04	0.04	0.04	0.04
20.400	0.04	0.04	0.04	0.04	0.04
20.650	0.04	0.04	0.04	0.04	0.04
20.900	0.04	0.04	0.04	0.04	0.04
21.150	0.04	0.04	0.04	0.04	0.04
21.400	0.04	0.04	0.04	0.04	0.04
21.650	0.04	0.04	0.04	0.04	0.04
21.900	0.04	0.04	0.04	0.04	0.04
22.150	0.03	0.03	0.03	0.03	0.03
22.400	0.03	0.03	0.03	0.03	0.03
22.650	0.03	0.03	0.03	0.03	0.03
22.900	0.03	0.03	0.03	0.03	0.03
23.150	0.03	0.03	0.03	0.03	0.03
23.400	0.03	0.03	0.03	0.03	0.03
23.650	0.03	0.03	0.03	0.03	0.03
23.900	0.03	0.03	0.03	0.03	0.02
24.150	0.01	0.00	0.00	0.00	(N/A)

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	EDA-1	0.010	12.350	0.05
Flow (In)	DP-1	0.010	12.350	0.05

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	EDA-1	0.050	12.150	0.53
Flow (In)	DP-1	0.050	12.150	0.53

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	EDA-1	0.155	12.150	1.77
Flow (In)	DP-1	0.155	12.150	1.77

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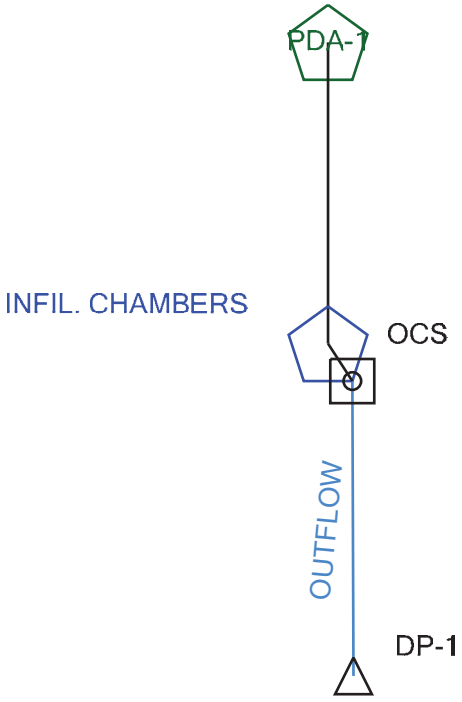
APPENDIX B

PROPOSED HYDROLOGIC CALCULATIONS

Scenario: Westchester-JMC - Synthetic Curve, 1 yrs



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WASHINGTON MEWS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
PDA-1	Westchester-JMC - Synthetic Curve, 1 yrs	1	4,379.000	12.100	1.023
PDA-1	Westchester-JMC - Synthetic Curve, 10 yrs	10	8,157.000	12.100	1.857
PDA-1	Westchester-JMC - Synthetic Curve, 100 yrs	100	14,646.000	12.100	3.280

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
DP-1	Westchester-JMC - Synthetic Curve, 1 yrs	1	0.000	27.050	0.000
DP-1	Westchester-JMC - Synthetic Curve, 10 yrs	10	731.000	12.550	0.294
DP-1	Westchester-JMC - Synthetic Curve, 100 yrs	100	4,663.000	12.300	1.657

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft³)
INFIL. CHAMBERS (IN)	Westchester-JMC - Synthetic Curve, 1 yrs	1	4,379.000	12.100	1.023	(N/A)	(N/A)
INFIL. CHAMBERS (OUT)	Westchester-JMC - Synthetic Curve, 1 yrs	1	0.000	27.050	0.000	84.00	2,241.000
INFIL. CHAMBERS (IN)	Westchester-JMC - Synthetic Curve, 10 yrs	10	8,157.000	12.100	1.857	(N/A)	(N/A)

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft³)
INFIL. CHAMBERS (OUT)	Westchester-JMC - Synthetic Curve, 10 yrs	10	731.000	12.550	0.294	84.36	2,708.000
INFIL. CHAMBERS (IN)	Westchester-JMC - Synthetic Curve, 100 yrs	100	14,646.000	12.100	3.280	(N/A)	(N/A)
INFIL. CHAMBERS (OUT)	Westchester-JMC - Synthetic Curve, 100 yrs	100	4,663.000	12.300	1.657	85.63	3,911.000

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Time-Depth Curve: TypeIII 24hr (2.8 in)	
Label	TypeIII 24hr (2.8 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.0	0.0	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.1	0.1	0.1
4.500	0.1	0.1	0.1	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.2	0.2
6.500	0.2	0.2	0.2	0.2	0.2
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.3	0.3	0.3
8.000	0.3	0.3	0.3	0.3	0.4
8.500	0.4	0.4	0.4	0.4	0.4
9.000	0.4	0.4	0.4	0.4	0.5
9.500	0.5	0.5	0.5	0.5	0.5
10.000	0.5	0.5	0.6	0.6	0.6
10.500	0.6	0.6	0.6	0.7	0.7
11.000	0.7	0.7	0.8	0.8	0.8
11.500	0.8	0.9	1.0	1.1	1.2
12.000	1.4	1.6	1.8	1.9	1.9
12.500	2.0	2.0	2.0	2.1	2.1
13.000	2.1	2.1	2.2	2.2	2.2
13.500	2.2	2.2	2.2	2.3	2.3
14.000	2.3	2.3	2.3	2.3	2.3
14.500	2.4	2.4	2.4	2.4	2.4
15.000	2.4	2.4	2.4	2.4	2.4
15.500	2.5	2.5	2.5	2.5	2.5
16.000	2.5	2.5	2.5	2.5	2.5

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	2.5	2.5	2.5	2.6	2.6
17.000	2.6	2.6	2.6	2.6	2.6
17.500	2.6	2.6	2.6	2.6	2.6
18.000	2.6	2.6	2.6	2.6	2.6
18.500	2.6	2.6	2.6	2.7	2.7
19.000	2.7	2.7	2.7	2.7	2.7
19.500	2.7	2.7	2.7	2.7	2.7
20.000	2.7	2.7	2.7	2.7	2.7
20.500	2.7	2.7	2.7	2.7	2.7
21.000	2.7	2.7	2.7	2.7	2.7
21.500	2.8	2.8	2.8	2.8	2.8
22.000	2.8	2.8	2.8	2.8	2.8
22.500	2.8	2.8	2.8	2.8	2.8
23.000	2.8	2.8	2.8	2.8	2.8
23.500	2.8	2.8	2.8	2.8	2.8
24.000	2.8	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Time-Depth Curve: TypeIII 24hr (5.1 in)	
Label	TypeIII 24hr (5.1 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.3	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.3	0.3	0.3	0.4
6.000	0.4	0.4	0.4	0.4	0.4
6.500	0.4	0.4	0.4	0.4	0.4
7.000	0.5	0.5	0.5	0.5	0.5
7.500	0.5	0.5	0.5	0.6	0.6
8.000	0.6	0.6	0.6	0.6	0.6
8.500	0.6	0.7	0.7	0.7	0.7
9.000	0.7	0.8	0.8	0.8	0.8
9.500	0.8	0.9	0.9	0.9	0.9
10.000	1.0	1.0	1.0	1.0	1.1
10.500	1.1	1.1	1.2	1.2	1.2
11.000	1.3	1.3	1.3	1.4	1.4
11.500	1.5	1.6	1.7	1.9	2.1
12.000	2.5	3.0	3.2	3.3	3.5
12.500	3.6	3.6	3.7	3.7	3.8
13.000	3.8	3.8	3.9	3.9	3.9
13.500	4.0	4.0	4.0	4.1	4.1
14.000	4.1	4.1	4.2	4.2	4.2
14.500	4.2	4.2	4.3	4.3	4.3
15.000	4.3	4.3	4.4	4.4	4.4
15.500	4.4	4.4	4.4	4.5	4.5
16.000	4.5	4.5	4.5	4.5	4.5

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	4.5	4.6	4.6	4.6	4.6
17.000	4.6	4.6	4.6	4.6	4.6
17.500	4.7	4.7	4.7	4.7	4.7
18.000	4.7	4.7	4.7	4.7	4.7
18.500	4.7	4.7	4.8	4.8	4.8
19.000	4.8	4.8	4.8	4.8	4.8
19.500	4.8	4.8	4.8	4.8	4.8
20.000	4.8	4.8	4.9	4.9	4.9
20.500	4.9	4.9	4.9	4.9	4.9
21.000	4.9	4.9	4.9	4.9	4.9
21.500	4.9	4.9	4.9	5.0	5.0
22.000	5.0	5.0	5.0	5.0	5.0
22.500	5.0	5.0	5.0	5.0	5.0
23.000	5.0	5.0	5.0	5.0	5.0
23.500	5.0	5.0	5.0	5.1	5.1
24.000	5.1	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Time-Depth Curve: TypeIII 24hr (8.9 in)	
Label	TypeIII 24hr (8.9 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.1	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.2	0.2	0.2
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.3	0.3
3.000	0.3	0.3	0.3	0.3	0.3
3.500	0.3	0.3	0.3	0.4	0.4
4.000	0.4	0.4	0.4	0.4	0.4
4.500	0.4	0.5	0.5	0.5	0.5
5.000	0.5	0.5	0.5	0.5	0.6
5.500	0.6	0.6	0.6	0.6	0.6
6.000	0.6	0.7	0.7	0.7	0.7
6.500	0.7	0.7	0.8	0.8	0.8
7.000	0.8	0.8	0.8	0.9	0.9
7.500	0.9	0.9	0.9	1.0	1.0
8.000	1.0	1.0	1.1	1.1	1.1
8.500	1.1	1.2	1.2	1.2	1.3
9.000	1.3	1.3	1.4	1.4	1.4
9.500	1.5	1.5	1.6	1.6	1.6
10.000	1.7	1.7	1.8	1.8	1.9
10.500	1.9	2.0	2.0	2.1	2.2
11.000	2.2	2.3	2.4	2.5	2.6
11.500	2.7	2.8	3.0	3.3	3.7
12.000	4.5	5.2	5.6	5.9	6.1
12.500	6.2	6.3	6.4	6.5	6.6
13.000	6.7	6.7	6.8	6.9	6.9
13.500	7.0	7.0	7.1	7.1	7.2
14.000	7.2	7.3	7.3	7.3	7.4
14.500	7.4	7.5	7.5	7.5	7.6
15.000	7.6	7.6	7.7	7.7	7.7
15.500	7.8	7.8	7.8	7.8	7.9
16.000	7.9	7.9	7.9	8.0	8.0

Subsection: Time-Depth Curve
Label: Westchester-JMC

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	8.0	8.0	8.0	8.1	8.1
17.000	8.1	8.1	8.1	8.1	8.2
17.500	8.2	8.2	8.2	8.2	8.2
18.000	8.3	8.3	8.3	8.3	8.3
18.500	8.3	8.3	8.4	8.4	8.4
19.000	8.4	8.4	8.4	8.4	8.4
19.500	8.5	8.5	8.5	8.5	8.5
20.000	8.5	8.5	8.5	8.6	8.6
20.500	8.6	8.6	8.6	8.6	8.6
21.000	8.6	8.6	8.6	8.7	8.7
21.500	8.7	8.7	8.7	8.7	8.7
22.000	8.7	8.7	8.7	8.8	8.8
22.500	8.8	8.8	8.8	8.8	8.8
23.000	8.8	8.8	8.8	8.8	8.9
23.500	8.9	8.9	8.9	8.9	8.9
24.000	8.9	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time of Concentration Calculations
Label: PDA-1

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	25.00 ft
Manning's n	0.410
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.05 ft/s
Segment Time of Concentration	0.154 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.154 hours

= = = = SCS Channel Flow

Tc =

R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

Subsection: Time of Concentration Calculations
Label: PDA-1

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	25.00 ft
Manning's n	0.410
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.05 ft/s
Segment Time of Concentration	0.154 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.154 hours

= = = = SCS Channel Flow

Tc =

R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

Subsection: Time of Concentration Calculations
Label: PDA-1

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	25.00 ft
Manning's n	0.410
Slope	0.010 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.05 ft/s
Segment Time of Concentration	0.154 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.154 hours

= = = = SCS Channel Flow

Tc =

R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

Subsection: Runoff CN-Area
Label: PDA-1

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
IMPERVIOUS	98.000	0.381	0.0	0.0	98.000
GREEN ROOF	98.000	0.085	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.466	(N/A)	(N/A)	98.000

Subsection: Runoff CN-Area
Label: PDA-1

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
IMPERVIOUS	98.000	0.381	0.0	0.0	98.000
GREEN ROOF	98.000	0.085	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.466	(N/A)	(N/A)	98.000

Subsection: Runoff CN-Area
Label: PDA-1

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
IMPERVIOUS	98.000	0.381	0.0	0.0	98.000
GREEN ROOF	98.000	0.085	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.466	(N/A)	(N/A)	98.000

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 1 years
Label: PDA-1 Storm Event: TypeIII 24hr (2.8 in)

Storm Event	TypeIII 24hr (2.8 in)
Return Event	1 years
Duration	35.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.154 hours
Area (User Defined)	0.466 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1.850	0.001	0.001	0.001	0.001	0.002
2.100	0.002	0.002	0.002	0.002	0.002
2.350	0.003	0.003	0.003	0.003	0.003
2.600	0.003	0.004	0.004	0.004	0.004
2.850	0.004	0.004	0.005	0.005	0.005
3.100	0.005	0.005	0.005	0.005	0.006
3.350	0.006	0.006	0.006	0.006	0.006
3.600	0.007	0.007	0.007	0.007	0.007
3.850	0.007	0.008	0.008	0.008	0.008
4.100	0.008	0.008	0.009	0.009	0.009
4.350	0.009	0.009	0.009	0.010	0.010
4.600	0.010	0.010	0.010	0.010	0.011
4.850	0.011	0.011	0.011	0.011	0.011
5.100	0.011	0.012	0.012	0.012	0.012
5.350	0.012	0.012	0.013	0.013	0.013
5.600	0.013	0.013	0.013	0.013	0.014
5.850	0.014	0.014	0.014	0.014	0.014
6.100	0.015	0.015	0.015	0.015	0.016
6.350	0.016	0.016	0.017	0.017	0.017
6.600	0.018	0.018	0.018	0.019	0.019
6.850	0.019	0.020	0.020	0.020	0.021
7.100	0.021	0.021	0.022	0.022	0.022
7.350	0.023	0.023	0.023	0.024	0.024
7.600	0.025	0.025	0.025	0.026	0.026
7.850	0.026	0.027	0.027	0.027	0.028
8.100	0.028	0.029	0.030	0.030	0.031
8.350	0.032	0.032	0.033	0.034	0.035
8.600	0.035	0.036	0.037	0.038	0.038
8.850	0.039	0.040	0.041	0.042	0.042
9.100	0.043	0.044	0.045	0.045	0.046
9.350	0.047	0.048	0.049	0.049	0.050
9.600	0.051	0.052	0.053	0.053	0.054

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 1 years
Label: PDA-1 Storm Event: TypeIII 24hr (2.8 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
9.850	0.055	0.056	0.057	0.057	0.058
10.100	0.059	0.061	0.062	0.063	0.065
10.350	0.067	0.068	0.070	0.071	0.073
10.600	0.074	0.076	0.078	0.079	0.081
10.850	0.083	0.084	0.086	0.087	0.089
11.100	0.093	0.096	0.101	0.107	0.113
11.350	0.118	0.124	0.130	0.137	0.148
11.600	0.170	0.202	0.249	0.299	0.355
11.850	0.410	0.470	0.570	0.766	0.940
12.100	1.023	1.007	0.851	0.686	0.572
12.350	0.491	0.421	0.360	0.298	0.246
12.600	0.203	0.173	0.156	0.145	0.136
12.850	0.129	0.123	0.117	0.111	0.105
13.100	0.100	0.097	0.094	0.092	0.090
13.350	0.089	0.087	0.086	0.084	0.082
13.600	0.081	0.079	0.078	0.076	0.075
13.850	0.073	0.071	0.070	0.068	0.067
14.100	0.065	0.064	0.063	0.063	0.062
14.350	0.061	0.060	0.060	0.059	0.058
14.600	0.057	0.057	0.056	0.055	0.054
14.850	0.054	0.053	0.052	0.051	0.050
15.100	0.050	0.049	0.048	0.047	0.047
15.350	0.046	0.045	0.044	0.044	0.043
15.600	0.042	0.041	0.041	0.040	0.039
15.850	0.038	0.038	0.037	0.036	0.035
16.100	0.035	0.034	0.034	0.033	0.033
16.350	0.033	0.032	0.032	0.032	0.031
16.600	0.031	0.031	0.030	0.030	0.030
16.850	0.029	0.029	0.029	0.028	0.028
17.100	0.028	0.028	0.027	0.027	0.026
17.350	0.026	0.026	0.025	0.025	0.025
17.600	0.025	0.024	0.024	0.024	0.023
17.850	0.023	0.023	0.022	0.022	0.022
18.100	0.021	0.021	0.021	0.021	0.021
18.350	0.021	0.021	0.020	0.020	0.020
18.600	0.020	0.020	0.020	0.020	0.020
18.850	0.020	0.020	0.019	0.019	0.019
19.100	0.019	0.019	0.019	0.019	0.019
19.350	0.019	0.019	0.018	0.018	0.018
19.600	0.018	0.018	0.018	0.018	0.018
19.850	0.018	0.018	0.017	0.017	0.017
20.100	0.017	0.017	0.017	0.017	0.017

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 1 years
Label: PDA-1 Storm Event: TypeIII 24hr (2.8 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
20.350	0.017	0.017	0.017	0.017	0.017
20.600	0.016	0.016	0.016	0.016	0.016
20.850	0.016	0.016	0.016	0.016	0.016
21.100	0.016	0.016	0.016	0.015	0.015
21.350	0.015	0.015	0.015	0.015	0.015
21.600	0.015	0.015	0.015	0.015	0.015
21.850	0.015	0.015	0.014	0.014	0.014
22.100	0.014	0.014	0.014	0.014	0.014
22.350	0.014	0.014	0.014	0.014	0.014
22.600	0.013	0.013	0.013	0.013	0.013
22.850	0.013	0.013	0.013	0.013	0.013
23.100	0.013	0.013	0.013	0.013	0.012
23.350	0.012	0.012	0.012	0.012	0.012
23.600	0.012	0.012	0.012	0.012	0.012
23.850	0.012	0.011	0.011	0.011	0.010
24.100	0.006	0.003	0.001	0.001	(N/A)

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: PDA-1 Storm Event: TypeIII 24hr (5.1 in)

Storm Event	TypeIII 24hr (5.1 in)
Return Event	10 years
Duration	35.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.154 hours
Area (User Defined)	0.466 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1.000	0.001	0.001	0.002	0.002	0.003
1.250	0.003	0.004	0.004	0.005	0.005
1.500	0.006	0.006	0.006	0.007	0.007
1.750	0.007	0.008	0.008	0.008	0.009
2.000	0.009	0.009	0.010	0.010	0.010
2.250	0.010	0.011	0.011	0.011	0.012
2.500	0.012	0.012	0.013	0.013	0.013
2.750	0.014	0.014	0.014	0.015	0.015
3.000	0.015	0.016	0.016	0.016	0.017
3.250	0.017	0.017	0.018	0.018	0.018
3.500	0.018	0.019	0.019	0.019	0.020
3.750	0.020	0.020	0.020	0.021	0.021
4.000	0.021	0.022	0.022	0.022	0.022
4.250	0.023	0.023	0.023	0.024	0.024
4.500	0.024	0.024	0.025	0.025	0.025
4.750	0.025	0.026	0.026	0.026	0.027
5.000	0.027	0.027	0.027	0.028	0.028
5.250	0.028	0.028	0.029	0.029	0.029
5.500	0.029	0.030	0.030	0.030	0.030
5.750	0.031	0.031	0.031	0.031	0.032
6.000	0.032	0.032	0.032	0.033	0.033
6.250	0.034	0.034	0.035	0.036	0.036
6.500	0.037	0.038	0.038	0.039	0.039
6.750	0.040	0.041	0.041	0.042	0.042
7.000	0.043	0.044	0.044	0.045	0.046
7.250	0.046	0.047	0.047	0.048	0.049
7.500	0.049	0.050	0.051	0.051	0.052
7.750	0.052	0.053	0.054	0.054	0.055
8.000	0.056	0.056	0.057	0.058	0.059
8.250	0.061	0.062	0.063	0.065	0.066
8.500	0.067	0.069	0.070	0.071	0.073
8.750	0.074	0.076	0.077	0.078	0.080

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: PDA-1 Storm Event: TypeIII 24hr (5.1 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
9.000	0.081	0.083	0.084	0.085	0.087
9.250	0.088	0.090	0.091	0.092	0.094
9.500	0.095	0.097	0.098	0.099	0.101
9.750	0.102	0.104	0.105	0.106	0.108
10.000	0.109	0.111	0.113	0.115	0.117
10.250	0.120	0.123	0.126	0.128	0.131
10.500	0.134	0.137	0.140	0.143	0.146
10.750	0.149	0.151	0.154	0.157	0.160
11.000	0.163	0.167	0.172	0.179	0.188
11.250	0.198	0.209	0.219	0.230	0.241
11.500	0.252	0.273	0.314	0.372	0.457
11.750	0.549	0.652	0.752	0.860	1.041
12.000	1.395	1.709	1.857	1.826	1.542
12.250	1.242	1.035	0.888	0.761	0.650
12.500	0.538	0.444	0.367	0.313	0.281
12.750	0.261	0.246	0.234	0.222	0.211
13.000	0.200	0.190	0.181	0.175	0.170
13.250	0.166	0.163	0.160	0.157	0.154
13.500	0.152	0.149	0.146	0.143	0.140
13.750	0.137	0.134	0.132	0.129	0.126
14.000	0.123	0.121	0.118	0.116	0.114
14.250	0.113	0.111	0.110	0.109	0.107
14.500	0.106	0.105	0.103	0.102	0.100
14.750	0.099	0.098	0.096	0.095	0.094
15.000	0.092	0.091	0.090	0.088	0.087
15.250	0.085	0.084	0.083	0.081	0.080
15.500	0.079	0.077	0.076	0.075	0.073
15.750	0.072	0.070	0.069	0.068	0.066
16.000	0.065	0.064	0.063	0.062	0.061
16.250	0.060	0.060	0.059	0.058	0.058
16.500	0.057	0.057	0.056	0.055	0.055
16.750	0.054	0.054	0.053	0.052	0.052
17.000	0.051	0.051	0.050	0.050	0.049
17.250	0.048	0.048	0.047	0.047	0.046
17.500	0.045	0.045	0.044	0.044	0.043
17.750	0.042	0.042	0.041	0.041	0.040
18.000	0.039	0.039	0.038	0.038	0.038
18.250	0.038	0.037	0.037	0.037	0.037
18.500	0.037	0.036	0.036	0.036	0.036
18.750	0.036	0.036	0.035	0.035	0.035
19.000	0.035	0.035	0.034	0.034	0.034
19.250	0.034	0.034	0.034	0.033	0.033

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: PDA-1 Storm Event: TypeIII 24hr (5.1 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
19.500	0.033	0.033	0.033	0.033	0.032
19.750	0.032	0.032	0.032	0.032	0.031
20.000	0.031	0.031	0.031	0.031	0.031
20.250	0.031	0.030	0.030	0.030	0.030
20.500	0.030	0.030	0.030	0.029	0.029
20.750	0.029	0.029	0.029	0.029	0.029
21.000	0.029	0.028	0.028	0.028	0.028
21.250	0.028	0.028	0.028	0.027	0.027
21.500	0.027	0.027	0.027	0.027	0.027
21.750	0.026	0.026	0.026	0.026	0.026
22.000	0.026	0.026	0.026	0.025	0.025
22.250	0.025	0.025	0.025	0.025	0.025
22.500	0.024	0.024	0.024	0.024	0.024
22.750	0.024	0.024	0.024	0.023	0.023
23.000	0.023	0.023	0.023	0.023	0.023
23.250	0.023	0.022	0.022	0.022	0.022
23.500	0.022	0.022	0.022	0.021	0.021
23.750	0.021	0.021	0.021	0.021	0.021
24.000	0.020	0.018	0.012	0.006	0.002
24.250	0.001	0.000	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: PDA-1 Storm Event: TypeIII 24hr (8.9 in)

Storm Event	TypeIII 24hr (8.9 in)
Return Event	100 years
Duration	35.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.154 hours
Area (User Defined)	0.466 acres

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.550	0.000	0.001	0.003	0.004	0.006
0.800	0.007	0.008	0.010	0.011	0.012
1.050	0.013	0.014	0.015	0.016	0.017
1.300	0.018	0.018	0.019	0.020	0.020
1.550	0.021	0.022	0.022	0.023	0.023
1.800	0.024	0.024	0.025	0.025	0.026
2.050	0.026	0.027	0.027	0.028	0.028
2.300	0.029	0.030	0.030	0.031	0.031
2.550	0.032	0.032	0.033	0.033	0.034
2.800	0.034	0.035	0.035	0.036	0.036
3.050	0.037	0.037	0.038	0.038	0.039
3.300	0.039	0.040	0.040	0.041	0.041
3.550	0.042	0.042	0.043	0.043	0.044
3.800	0.044	0.044	0.045	0.045	0.046
4.050	0.046	0.047	0.047	0.047	0.048
4.300	0.048	0.049	0.049	0.050	0.050
4.550	0.050	0.051	0.051	0.052	0.052
4.800	0.052	0.053	0.053	0.054	0.054
5.050	0.054	0.055	0.055	0.056	0.056
5.300	0.056	0.057	0.057	0.057	0.058
5.550	0.058	0.059	0.059	0.059	0.060
5.800	0.060	0.061	0.061	0.061	0.062
6.050	0.062	0.063	0.064	0.064	0.065
6.300	0.066	0.067	0.068	0.069	0.071
6.550	0.072	0.073	0.074	0.075	0.076
6.800	0.077	0.078	0.079	0.080	0.081
7.050	0.082	0.083	0.085	0.086	0.087
7.300	0.088	0.089	0.090	0.091	0.092
7.550	0.093	0.094	0.095	0.096	0.097
7.800	0.099	0.099	0.101	0.102	0.103
8.050	0.104	0.106	0.107	0.109	0.112
8.300	0.114	0.116	0.119	0.121	0.124

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: PDA-1 Storm Event: TypeIII 24hr (8.9 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
8.550	0.126	0.128	0.131	0.133	0.136
8.800	0.138	0.140	0.143	0.145	0.148
9.050	0.150	0.153	0.155	0.158	0.160
9.300	0.162	0.165	0.167	0.170	0.172
9.550	0.175	0.177	0.179	0.182	0.184
9.800	0.187	0.189	0.192	0.194	0.196
10.050	0.199	0.202	0.206	0.211	0.215
10.300	0.220	0.225	0.230	0.235	0.240
10.550	0.245	0.250	0.255	0.261	0.265
10.800	0.271	0.275	0.281	0.286	0.291
11.050	0.297	0.307	0.319	0.336	0.353
11.300	0.372	0.390	0.410	0.429	0.449
11.550	0.485	0.558	0.660	0.812	0.974
11.800	1.155	1.332	1.522	1.842	2.467
12.050	3.020	3.280	3.224	2.722	2.191
12.300	1.825	1.566	1.341	1.145	0.949
12.550	0.783	0.647	0.552	0.495	0.460
12.800	0.434	0.412	0.391	0.371	0.352
13.050	0.334	0.319	0.308	0.300	0.293
13.300	0.288	0.282	0.277	0.272	0.267
13.550	0.262	0.257	0.252	0.247	0.242
13.800	0.237	0.232	0.227	0.222	0.217
14.050	0.212	0.208	0.204	0.201	0.199
14.300	0.196	0.194	0.191	0.189	0.187
14.550	0.184	0.182	0.179	0.177	0.175
14.800	0.172	0.170	0.167	0.165	0.163
15.050	0.160	0.158	0.155	0.153	0.151
15.300	0.148	0.146	0.143	0.141	0.138
15.550	0.136	0.134	0.131	0.129	0.127
15.800	0.124	0.122	0.119	0.117	0.114
16.050	0.112	0.110	0.109	0.107	0.106
16.300	0.105	0.104	0.103	0.102	0.101
16.550	0.100	0.099	0.098	0.097	0.096
16.800	0.094	0.093	0.092	0.091	0.090
17.050	0.089	0.088	0.087	0.086	0.085
17.300	0.084	0.083	0.082	0.081	0.080
17.550	0.079	0.078	0.077	0.076	0.075
17.800	0.074	0.072	0.071	0.071	0.069
18.050	0.068	0.068	0.067	0.066	0.066
18.300	0.066	0.065	0.065	0.065	0.064
18.550	0.064	0.064	0.064	0.063	0.063
18.800	0.063	0.062	0.062	0.062	0.061

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: PDA-1 Storm Event: TypeIII 24hr (8.9 in)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
19.050	0.061	0.061	0.060	0.060	0.060
19.300	0.059	0.059	0.059	0.059	0.058
19.550	0.058	0.058	0.057	0.057	0.057
19.800	0.056	0.056	0.056	0.055	0.055
20.050	0.055	0.054	0.054	0.054	0.054
20.300	0.054	0.053	0.053	0.053	0.053
20.550	0.052	0.052	0.052	0.052	0.051
20.800	0.051	0.051	0.051	0.050	0.050
21.050	0.050	0.050	0.049	0.049	0.049
21.300	0.049	0.049	0.048	0.048	0.048
21.550	0.047	0.047	0.047	0.047	0.047
21.800	0.046	0.046	0.046	0.046	0.045
22.050	0.045	0.045	0.045	0.045	0.044
22.300	0.044	0.044	0.044	0.043	0.043
22.550	0.043	0.043	0.043	0.042	0.042
22.800	0.042	0.041	0.041	0.041	0.041
23.050	0.041	0.040	0.040	0.040	0.040
23.300	0.039	0.039	0.039	0.039	0.039
23.550	0.038	0.038	0.038	0.037	0.037
23.800	0.037	0.037	0.036	0.036	0.036
24.050	0.032	0.020	0.010	0.004	0.002
24.300	0.001	(N/A)	(N/A)	(N/A)	(N/A)

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
OUTFLOW	INFIL. CHAMBERS

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	OUTFLOW	0.000	27.050	0.000
Flow (In)	DP-1	0.000	27.050	0.000

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
OUTFLOW	INFIL. CHAMBERS

Node Inflows

Inflow Type	Element	Volume (ft³)	Time to Peak (hours)	Flow (Peak) (ft³/s)
Flow (From)	OUTFLOW	731.468	12.550	0.294
Flow (In)	DP-1	731.468	12.550	0.294

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
OUTFLOW	INFIL. CHAMBERS

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	OUTFLOW	4,663.161	12.300	1.657
Flow (In)	DP-1	4,663.161	12.300	1.657

Subsection: Storage Chamber System
Label: INFIL. CHAMBERS

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Storage Chamber			
ID	51	Notes	Created on 06/23/2009. Check with manufacturer for updates.
Label	Recharger (R) 330 XL		

Storage Chamber			
Effective Length	7.00 ft	Manufacturer	CULTEC
Section Length Varies?	False	Default Spacing	0.50 ft

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft^3/ft)
0.00	0.00
0.08	0.33
0.17	0.33
0.25	0.33
0.33	0.32
0.42	0.32
0.50	0.32
0.58	0.32
0.67	0.31
0.75	0.31
0.83	0.30
0.92	0.30
1.00	0.30
1.08	0.30
1.17	0.30
1.25	0.29
1.33	0.28
1.42	0.27
1.50	0.26
1.58	0.25
1.67	0.24
1.75	0.23
1.83	0.22
1.92	0.21
2.00	0.19
2.08	0.17
2.17	0.15
2.25	0.12
2.33	0.08

Subsection: Storage Chamber System
Label: INFIL. CHAMBERS

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft^3/ft)
2.42	0.05
2.50	0.02

Storage Chamber			
Storage Chamber Type	Incremental Volume Per Unit Length	Maximum Width	4.33 ft

Storage Chamber (Pond)	
Chamber System Invert	82.17 ft
Chamber System Rows	1
Chambers per Row	42
Chamber System Fill Void Space	40.0 %
Chamber System Row Spacing	6.0 in
Chamber System Side Fill	12.0 in
Chamber System Fill Cover Depth	6.0 in
Chamber System Fill Base Depth	6.0 in
Chamber System Fill Side Slope	0.000 H:V
Chamber System End Fill	12.0 in
Chamber System Includes Header?	False

Subsection: Storage Chamber System
Label: INFIL. CHAMBERS

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Storage Chamber			
ID	51	Notes	Created on 06/23/2009. Check with manufacturer for updates.
Label	Recharger (R) 330 XL		

Storage Chamber

Subsection: Storage Chamber System
Label: INFIL. CHAMBERS

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Storage Chamber			
Effective Length	7.00 ft	Manufacturer	CULTEC
Section Length Varies?	False	Default Spacing	0.50 ft

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft^3/ft)
0.00	0.00
0.08	0.33
0.17	0.33
0.25	0.33
0.33	0.32
0.42	0.32
0.50	0.32
0.58	0.32
0.67	0.31
0.75	0.31
0.83	0.30
0.92	0.30
1.00	0.30
1.08	0.30
1.17	0.30
1.25	0.29
1.33	0.28
1.42	0.27
1.50	0.26
1.58	0.25
1.67	0.24
1.75	0.23
1.83	0.22
1.92	0.21
2.00	0.19
2.08	0.17
2.17	0.15
2.25	0.12
2.33	0.08
2.42	0.05
2.50	0.02

Storage Chamber			
Storage Chamber Type	Incremental Volume Per Unit Length	Maximum Width	4.33 ft

Subsection: Storage Chamber System
Label: INFIL. CHAMBERS

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Storage Chamber (Pond)	
Chamber System Invert	82.17 ft
Chamber System Rows	1
Chambers per Row	42
Chamber System Fill Void Space	40.0 %
Chamber System Row Spacing	6.0 in
Chamber System Side Fill	12.0 in
Chamber System Fill Cover Depth	6.0 in
Chamber System Fill Base Depth	6.0 in
Chamber System Fill Side Slope	0.000 H:V
Chamber System End Fill	12.0 in
Chamber System Includes Header?	False

Subsection: Storage Chamber System
Label: INFIL. CHAMBERS

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Storage Chamber			
ID	51	Notes	Created on 06/23/2009. Check with manufacturer for updates.
Label	Recharger (R) 330 XL		

Storage Chamber			
Effective Length	7.00 ft	Manufacturer	CULTEC
Section Length Varies?	False	Default Spacing	0.50 ft

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft^3/ft)
0.00	0.00
0.08	0.33
0.17	0.33
0.25	0.33
0.33	0.32
0.42	0.32

Subsection: Storage Chamber System
Label: INFIL. CHAMBERS

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft^3/ft)
0.50	0.32
0.58	0.32
0.67	0.31
0.75	0.31
0.83	0.30
0.92	0.30
1.00	0.30
1.08	0.30
1.17	0.30
1.25	0.29
1.33	0.28
1.42	0.27
1.50	0.26
1.58	0.25
1.67	0.24
1.75	0.23
1.83	0.22
1.92	0.21
2.00	0.19
2.08	0.17
2.17	0.15
2.25	0.12
2.33	0.08
2.42	0.05
2.50	0.02

Storage Chamber			
Storage Chamber Type	Incremental Volume Per Unit Length	Maximum Width	4.33 ft

Storage Chamber (Pond)	
Chamber System Invert	82.17 ft
Chamber System Rows	1
Chambers per Row	42
Chamber System Fill Void Space	40.0 %
Chamber System Row Spacing	6.0 in
Chamber System Side Fill	12.0 in

Subsection: Storage Chamber System
Label: INFIL. CHAMBERS

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Storage Chamber (Pond)	
Chamber System Fill Cover Depth	6.0 in
Chamber System Fill Base Depth	6.0 in
Chamber System Fill Side Slope	0.000 H:V
Chamber System End Fill	12.0 in
Chamber System Includes Header?	False

Subsection: Outlet Input Data
Label: OCS

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Requested Pond Water Surface Elevations	
Minimum (Headwater)	82.17 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	85.67 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	O1	Forward	C0	84.00	85.67
Culvert-Circular	C0	Forward	TW	83.42	85.67
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data
Label: OCS

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Structure ID: C0 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	12.00 in
Length	50.00 ft
Length (Computed Barrel)	50.00 ft
Slope (Computed)	0.008 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.031
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.105
T2 ratio (HW/D)	1.193
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	84.52 ft	T1 Flow	2.749 ft^3/s
T2 Elevation	84.61 ft	T2 Flow	3.142 ft^3/s

Subsection: Outlet Input Data
Label: OCS

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Structure ID: O1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	84.00 ft
Orifice Diameter	7.50 in
Orifice Coefficient	0.600

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.100 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Subsection: Outlet Input Data
Label: OCS

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Requested Pond Water Surface Elevations	
Minimum (Headwater)	82.17 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	85.67 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	O1	Forward	C0	84.00	85.67
Culvert-Circular	C0	Forward	TW	83.42	85.67
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data
Label: OCS

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Structure ID: C0 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	12.00 in
Length	50.00 ft
Length (Computed Barrel)	50.00 ft
Slope (Computed)	0.008 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.031
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.105
T2 ratio (HW/D)	1.193
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	84.52 ft	T1 Flow	2.749 ft^3/s
T2 Elevation	84.61 ft	T2 Flow	3.142 ft^3/s

Subsection: Outlet Input Data
Label: OCS

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Structure ID: O1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	84.00 ft
Orifice Diameter	7.50 in
Orifice Coefficient	0.600

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.100 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	82.17 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	85.67 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	O1	Forward	C0	84.00	85.67
Culvert-Circular	C0	Forward	TW	83.42	85.67
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data
Label: OCS

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Structure ID: C0 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	12.00 in
Length	50.00 ft
Length (Computed Barrel)	50.00 ft
Slope (Computed)	0.008 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.031
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.105
T2 ratio (HW/D)	1.193
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	84.52 ft	T1 Flow	2.749 ft^3/s
T2 Elevation	84.61 ft	T2 Flow	3.142 ft^3/s

Structure ID: O1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	84.00 ft
Orifice Diameter	7.50 in
Orifice Coefficient	0.600

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.100 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

Subsection: Elevation-Volume-Flow Table (Pond)
Label: INFIL. CHAMBERS

Return Event: 1 years
Storm Event: TypeIII 24hr (2.8 in)

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.176 ft³/s

Initial Conditions	
Elevation (Water Surface, Initial)	82.17 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.000 ft³/s
Flow (Initial Infiltration)	0.000 ft³/s
Flow (Initial, Total)	0.000 ft³/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (acres)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
82.17	0.000	0.000	0.000	0.000	0.000	0.000
82.27	0.000	74.987	0.000	0.176	0.176	1.009
82.37	0.000	149.973	0.000	0.176	0.176	1.842
82.47	0.000	224.960	0.000	0.176	0.176	2.676
82.57	0.000	299.947	0.000	0.176	0.176	3.509
82.67	0.000	374.933	0.000	0.176	0.176	4.342
82.77	0.000	518.822	0.000	0.176	0.176	5.941
82.87	0.000	662.710	0.000	0.176	0.176	7.539
82.97	0.000	806.599	0.000	0.176	0.176	9.138
83.07	0.000	950.487	0.000	0.176	0.176	10.737
83.17	0.000	1,094.376	0.000	0.176	0.176	12.336
83.27	0.000	1,234.560	0.000	0.176	0.176	13.893
83.37	0.000	1,374.744	0.000	0.176	0.176	15.451
83.42	0.000	1,444.836	0.000	0.176	0.176	16.230
83.47	0.000	1,514.928	0.000	0.176	0.176	17.009
83.57	0.000	1,655.112	0.000	0.176	0.176	18.566
83.67	0.000	1,795.296	0.000	0.176	0.176	20.124
83.77	0.000	1,930.506	0.000	0.176	0.176	21.626
83.87	0.000	2,065.716	0.000	0.176	0.176	23.128
83.97	0.000	2,200.925	0.000	0.176	0.176	24.631
84.00	0.000	2,241.488	0.000	0.176	0.176	25.081
84.07	0.097	2,336.135	0.000	0.176	0.273	26.230
84.17	0.097	2,471.345	0.000	0.176	0.273	27.732
84.27	0.097	2,593.959	0.000	0.176	0.273	29.095
84.37	0.310	2,716.574	0.000	0.176	0.486	30.670
84.47	0.487	2,839.189	0.000	0.176	0.663	32.209
84.57	0.682	2,961.803	0.000	0.176	0.858	33.767
84.67	0.791	3,084.418	0.000	0.176	0.967	35.238

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 1 years
Label: INFIL. CHAMBERS Storm Event: TypeIII 24hr (2.8 in)

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (acres)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
84.77	0.999	3,180.608	0.000	0.176	1.175	36.515
84.87	1.180	3,276.798	0.000	0.176	1.356	37.765
84.97	1.295	3,372.988	0.000	0.176	1.471	38.948
85.07	1.295	3,469.178	0.000	0.176	1.471	40.017
85.17	1.308	3,565.368	0.000	0.176	1.484	41.099
85.27	1.308	3,640.354	0.000	0.176	1.484	41.932
85.37	1.543	3,715.341	0.000	0.176	1.719	43.001
85.47	1.543	3,790.328	0.000	0.176	1.719	43.834
85.57	1.543	3,865.314	0.000	0.176	1.719	44.667
85.67	1.731	3,940.301	0.000	0.176	1.907	45.688

Subsection: Elevation-Volume-Flow Table (Pond)
Label: INFIL. CHAMBERS

Return Event: 10 years
Storm Event: TypeIII 24hr (5.1 in)

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.176 ft³/s

Initial Conditions	
Elevation (Water Surface, Initial)	82.17 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.000 ft³/s
Flow (Initial Infiltration)	0.000 ft³/s
Flow (Initial, Total)	0.000 ft³/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (acres)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
82.17	0.000	0.000	0.000	0.000	0.000	0.000
82.27	0.000	74.987	0.000	0.176	0.176	1.009
82.37	0.000	149.973	0.000	0.176	0.176	1.842
82.47	0.000	224.960	0.000	0.176	0.176	2.676
82.57	0.000	299.947	0.000	0.176	0.176	3.509
82.67	0.000	374.933	0.000	0.176	0.176	4.342
82.77	0.000	518.822	0.000	0.176	0.176	5.941
82.87	0.000	662.710	0.000	0.176	0.176	7.539
82.97	0.000	806.599	0.000	0.176	0.176	9.138
83.07	0.000	950.487	0.000	0.176	0.176	10.737
83.17	0.000	1,094.376	0.000	0.176	0.176	12.336
83.27	0.000	1,234.560	0.000	0.176	0.176	13.893
83.37	0.000	1,374.744	0.000	0.176	0.176	15.451
83.42	0.000	1,444.836	0.000	0.176	0.176	16.230
83.47	0.000	1,514.928	0.000	0.176	0.176	17.009
83.57	0.000	1,655.112	0.000	0.176	0.176	18.566
83.67	0.000	1,795.296	0.000	0.176	0.176	20.124
83.77	0.000	1,930.506	0.000	0.176	0.176	21.626
83.87	0.000	2,065.716	0.000	0.176	0.176	23.128
83.97	0.000	2,200.925	0.000	0.176	0.176	24.631
84.00	0.000	2,241.488	0.000	0.176	0.176	25.081
84.07	0.097	2,336.135	0.000	0.176	0.273	26.230
84.17	0.097	2,471.345	0.000	0.176	0.273	27.732
84.27	0.097	2,593.959	0.000	0.176	0.273	29.095
84.37	0.310	2,716.574	0.000	0.176	0.486	30.670
84.47	0.487	2,839.189	0.000	0.176	0.663	32.209
84.57	0.682	2,961.803	0.000	0.176	0.858	33.767
84.67	0.791	3,084.418	0.000	0.176	0.967	35.238

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 10 years
Label: INFIL. CHAMBERS Storm Event: TypeIII 24hr (5.1 in)

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (acres)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
84.77	0.999	3,180.608	0.000	0.176	1.175	36.515
84.87	1.180	3,276.798	0.000	0.176	1.356	37.765
84.97	1.295	3,372.988	0.000	0.176	1.471	38.948
85.07	1.295	3,469.178	0.000	0.176	1.471	40.017
85.17	1.308	3,565.368	0.000	0.176	1.484	41.099
85.27	1.308	3,640.354	0.000	0.176	1.484	41.932
85.37	1.543	3,715.341	0.000	0.176	1.719	43.001
85.47	1.543	3,790.328	0.000	0.176	1.719	43.834
85.57	1.543	3,865.314	0.000	0.176	1.719	44.667
85.67	1.731	3,940.301	0.000	0.176	1.907	45.688

Subsection: Elevation-Volume-Flow Table (Pond)
Label: INFIL. CHAMBERS

Return Event: 100 years
Storm Event: TypeIII 24hr (8.9 in)

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.176 ft³/s

Initial Conditions	
Elevation (Water Surface, Initial)	82.17 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.000 ft³/s
Flow (Initial Infiltration)	0.000 ft³/s
Flow (Initial, Total)	0.000 ft³/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (acres)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
82.17	0.000	0.000	0.000	0.000	0.000	0.000
82.27	0.000	74.987	0.000	0.176	0.176	1.009
82.37	0.000	149.973	0.000	0.176	0.176	1.842
82.47	0.000	224.960	0.000	0.176	0.176	2.676
82.57	0.000	299.947	0.000	0.176	0.176	3.509
82.67	0.000	374.933	0.000	0.176	0.176	4.342
82.77	0.000	518.822	0.000	0.176	0.176	5.941
82.87	0.000	662.710	0.000	0.176	0.176	7.539
82.97	0.000	806.599	0.000	0.176	0.176	9.138
83.07	0.000	950.487	0.000	0.176	0.176	10.737
83.17	0.000	1,094.376	0.000	0.176	0.176	12.336
83.27	0.000	1,234.560	0.000	0.176	0.176	13.893
83.37	0.000	1,374.744	0.000	0.176	0.176	15.451
83.42	0.000	1,444.836	0.000	0.176	0.176	16.230
83.47	0.000	1,514.928	0.000	0.176	0.176	17.009
83.57	0.000	1,655.112	0.000	0.176	0.176	18.566
83.67	0.000	1,795.296	0.000	0.176	0.176	20.124
83.77	0.000	1,930.506	0.000	0.176	0.176	21.626
83.87	0.000	2,065.716	0.000	0.176	0.176	23.128
83.97	0.000	2,200.925	0.000	0.176	0.176	24.631
84.00	0.000	2,241.488	0.000	0.176	0.176	25.081
84.07	0.097	2,336.135	0.000	0.176	0.273	26.230
84.17	0.097	2,471.345	0.000	0.176	0.273	27.732
84.27	0.097	2,593.959	0.000	0.176	0.273	29.095
84.37	0.310	2,716.574	0.000	0.176	0.486	30.670
84.47	0.487	2,839.189	0.000	0.176	0.663	32.209
84.57	0.682	2,961.803	0.000	0.176	0.858	33.767
84.67	0.791	3,084.418	0.000	0.176	0.967	35.238

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: INFIL. CHAMBERS Storm Event: TypeIII 24hr (8.9 in)

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (acres)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
84.77	0.999	3,180.608	0.000	0.176	1.175	36.515
84.87	1.180	3,276.798	0.000	0.176	1.356	37.765
84.97	1.295	3,372.988	0.000	0.176	1.471	38.948
85.07	1.295	3,469.178	0.000	0.176	1.471	40.017
85.17	1.308	3,565.368	0.000	0.176	1.484	41.099
85.27	1.308	3,640.354	0.000	0.176	1.484	41.932
85.37	1.543	3,715.341	0.000	0.176	1.719	43.001
85.47	1.543	3,790.328	0.000	0.176	1.719	43.834
85.57	1.543	3,865.314	0.000	0.176	1.719	44.667
85.67	1.731	3,940.301	0.000	0.176	1.907	45.688

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: INFIL. CHAMBERS (OUT) Storm Event: TypeIII 24hr (2.8 in)

Peak Discharge	0.000 ft³/s
Time to Peak	27.050 hours
Hydrograph Volume	0.000 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.000	0.000	(N/A)	(N/A)	(N/A)

Subsection: Pond Routed Hydrograph (total out) Return Event: 10 years
Label: INFIL. CHAMBERS (OUT) Storm Event: TypeIII 24hr (5.1 in)

Peak Discharge	0.294 ft³/s
Time to Peak	12.550 hours
Hydrograph Volume	731.468 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
12.250	0.000	0.097	0.097	0.130	0.238
12.500	0.287	0.294	0.277	0.246	0.213
12.750	0.181	0.153	0.129	0.108	0.097
13.000	0.097	0.097	0.097	0.097	0.097
13.250	0.097	0.097	0.097	0.097	0.097
13.500	0.097	0.097	0.097	0.084	0.064
13.750	0.047	0.032	0.020	0.009	0.000

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: INFIL. CHAMBERS (OUT) Storm Event: TypeIII 24hr (8.9 in)

Peak Discharge	1.657 ft³/s
Time to Peak	12.300 hours
Hydrograph Volume	4,663.155 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
11.950	0.000	0.034	0.293	0.900	1.298
12.200	1.543	1.556	1.657	1.607	1.543
12.450	1.543	1.335	1.304	1.295	1.141
12.700	0.900	0.752	0.680	0.571	0.485
12.950	0.420	0.366	0.320	0.277	0.239
13.200	0.209	0.185	0.166	0.151	0.138
13.450	0.127	0.118	0.110	0.103	0.097
13.700	0.097	0.097	0.097	0.097	0.097
13.950	0.097	0.097	0.097	0.097	0.097
14.200	0.097	0.097	0.097	0.097	0.097
14.450	0.097	0.097	0.097	0.097	0.097
14.700	0.097	0.091	0.075	0.062	0.050
14.950	0.040	0.031	0.023	0.017	0.010
15.200	0.005	0.000	(N/A)	(N/A)	(N/A)

Index

W

APPENDIX C

WATER QUALITY VOLUME CALCULATIONS

WATER QUALITY VOLUME WORKSHEET JMC Project: **15207**

FOR REDEVELOPMENT PROJECTS Design Point: **1**

WASHINGTON MEWS Drainage Area: **1**

Initial Water Quality Treatment Volume

DESCRIPTION	Design Storm	Area	Existing Impervious Area	New Impervious Area	Percent Impervious	Runoff Coefficient	Total Required WQ Volume
SYMBOL	P	A	I_E	I_N	%I	R_V	WQ_V
VALUE	1.5	0.56	0.16	0.21	66.41	0.647704583	**1,979**
UNITS	In	Ac	Ac	Ac	%	CF	CF
VALUE	Enhanced Phosphorus Removal (WQ_V = 1-yr Storm Runoff)						

Runoff Reduction Techniques (Area)

DESCRIPTION	Total Area	Impervious Area
SYMBOL	A	I
Conservation of Natural Areas		
Sheetflow to Riparian Buffers or Filter Strips		
Vegetated Swale		
Tree Planting / Tree Pit		
Disconnection of Rooftop Runoff		
Stream Daylighting		
TOTAL		
UNITS	Ac	Ac

Adjusted Water Quality Treatment Volume from Runoff Reduction Techniques

DESCRIPTION	Design Storm	Area	Adjusted Existing Impervious Area	New Impervious Area	Percent Impervious	Runoff Coefficient	Total Required WQ Volume
SYMBOL	P	A	I_{EA}	I_N	%I	R_V	WQ_V
VALUE	1.5	0.56	0.16	0.21	66.41	0.647704583	**1,979**
UNITS	In	Ac	Ac	Ac	%	CF	CF
VALUE	Enhanced Phosphorus Removal (WQ_V = 1-yr Storm Runoff)						

Net Water Quality Treatment Volume = Adjusted WQv - Provided RRv

Initial Water Quality Treatment Volume	1,979	CF
Adjusted Water Quality Treatment Volume	1,979	CF
Provided Runoff Reduction Volume	2,287	CF
Net Water Quality Treatment Volume	-309	CF

Date Printed: 11/4/2015

GREEN ROOF WORKSHEET

JMC Project:	**15207**
Design Point:	**1**
Drainage Area:	**1**

Green Roof

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I_N	0.09	
Area	A	0.09	Ac
Percent Impervious	%I	100.00	%
Runoff Volume [0.05 + 0.009 x %I]	R_V	0.95	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**471**	CF

Proposed Green Roof			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Green Roof surface AREA	A_{RG}	3,968.00	SF
DEPTH of the Soil Media	D_{SM}	0.25	Ft
DEPTH of the Drainage Layer	D_{DL}	0.17	Ft
DEPTH of Ponding above surface	D_P	0.04	Ft
Porosity of the Soil Media	n_{SM}	20%	%
Porosity of the Drainage Layer	n_{DL}	25%	%
VOLUME provided in Soil Media [$V_{SM} = A_{RG} \times D_{SM} \times n_{SM}$]	V_{SM}	198.40	CF
VOLUME provided in Drainage Layer [$V_{DL} = A_{RG} \times D_{SM} \times n_{SM}$]	V_{DL}	165.33	CF
VOLUME provided in Ponding Area [$D_P \times A_{RG}$]		165.33	CF
TOTAL VOLUME Provided [$WQv \leq V_{SM} + V_{DL} + (D_P \times A_{RG})$]	WQ_V	**529**	CF

Runoff Reduction			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Runoff Reduction volume provided	RR_V	**529**	CF

INFILTRATION WORKSHEET

JMC Project:	**15207**
Design Point:	**1**
Drainage Area:	**1**

Subsurface Infiltration System

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.37	Ac
Area	A	0.47	Ac
Percent Impervious	%I	79.41	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.76	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**1,954**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Minimum Infiltration Basin Area			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	1,954	CF
Depth of the Basin	d_b	2.54	Ft
Required Bottom Area of Infiltration Basin [$A_p = WQ_V / d_b$]	A_p	**768.68**	SF

Proposed Infiltration Trench			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Provided Bottom Area of Infiltration Basin		1,420.00	SF
Total Area of Infiltration Basin Provided	A_p	**1,420.00**	SF

Runoff Reduction			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
90% Runoff Reduction capacity	RR_V	**1,758**	CF

Date Printed: 11/5/2015

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**15207**
Design Point:	**1**
Drainage Area:	**1**

Continuous Deflective Separation Unit

Rainfall Distribution Type: **III**

		A	B	C
Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.37	Ac
Area	A	0.47	Ac
Percent Impervious	%I	79.41	%
Runoff Coefficient [$0.05 + 0.009 \times \%I$]	R_V	0.76	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**1,954**	CF
Design Storm [1-yr Storm Depth]	P	1.5	In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	1,954	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.1000	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	1.15	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\ QP)^{½}$]	CN	96.60	
Curve Number	CN	97	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.07	In
Ratio [$R = I_a / P$]	R	0.05	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.49	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.18	
Unit Peak Discharge	q_u	602.50	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**0.51**	cfs

Proposed Device			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**0.7**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**2,677**	CF
Model Designation		CDS2015-4	
Quantity		1	

Date Printed: 11/4/2015

RUNOFF REDUCTION VOLUME WORKSHEET

JMC Project:	15207
Design Point:	1

WASHINGTON MEWS	Drainage Area:	1

Total Water Quality Treatment Volume

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Initial Water Quality Volume	WQ_V	**1,979**	CF
Adjusted Water Quality Volume	WQ_V	**748**	CF

Minimum Runoff Reduction Volume

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Total Area of *new* Impervious Cover	Aic	0.21	Ac
Hydrologic Soil Group (HSG) Specific Reduction Factor	S	0.55	
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.95	CF
Impervious Cover targeted for Runoff Reduction [S x Aic]	Ai	0.12	Ac
TOTAL VOLUME Required [RR_V = (P x R_V x Ai) / 12]	RR_V	**599**	CF

Runoff Reduction Techniques (Volume)

GREEN INFRASTRUCTURE PRACTICE / SMP	*SYMBOL*	*VALUE*	*UNITS*
GREEN ROOF	RR_V	529	CF
SUBSURFACE INFILTRATION SYSTEM	RR_V	1,758	CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
TOTAL	RR_V	**2,287**	CF

Runoff Reduction

Is Total RR_V > Adjusted WQ_V ?	**YES**
Is Total RR_V > Minimum RR_V ?	**YES**

Date Printed: 11/4/2015

APPENDIX D

SOIL TESTING DATA

Phone
(203) 262-9328

Telefax
(203) 264-3414

WHITE PLAINS, N.Y.
(914) 946-4850

SOILTESTING, INC.

90 DONOVAN ROAD - OXFORD, CONN. 06478-1028

GEOTECHNICAL / ENVIRONMENTAL SUBSURFACE INVESTIGATIONS - Test Borings - Core Drilling
Monitoring Wells - Recovery Wells - Direct Push/Probe Sampling
UNDERPINNING - HELICAL PILES - SOIL NAILS

October 16, 2015

Baldwin & Franklin Architects
73 Washington Ave
Hastings-on-Hudson, NY 10706
914-693-5324

Attn: Ned Baldwin

Re: 17 Washington Avenue **G221-0191-15**
Hastings-on-Hudson, NY

Dear Mr. Baldwin,

Enclosed are boring logs and location plan for the above referenced project site.

If you have any questions, please do not hesitate to contact us.

Very truly yours,
SOILTESTING, INC.

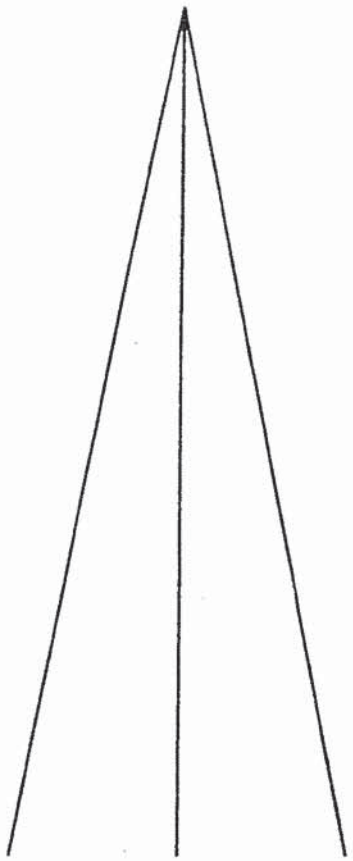
James A DeAngelis

James A. DeAngelis
President

JAD:ec

SOILTESTING, INC.

TO	Baldwin & Franklin Architects	DATE	October 16, 2015
ADDRESS	73 Washington Ave, Hastings-on-Hudson, NY 10706		
SITE LOCATION	17 Washington Avenue, Hastings-on-Hudson, NY,		
REPORT SENT TO	Ned Baldwin		
SAMPLES SENT TO	Storage (Max. 60 days)		



90 DONOVAN ROAD
Oxford, Connecticut 06478
(203) 262-9328

Branch Office:
White Plains, New York 10607
914-946-4850

JOB NO.
G221-0191-15

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Baldwin & Franklin Architects	SHEET 1 OF 1 HOLE NO. B-1
	PROJECT NO. G221-0191-15	
	PROJECT NAME 17 Washington Avenue	BORING LOCATIONS per Plan
FOREMAN - DRILLER BD/bk/md	LOCATION Hasting-on-Hudson, NY	
INSPECTOR		OFFSET

	CASING	SAMPLER	CORE BAR		
TYPE	HSA	SS		DATE START	10/9/15
SIZE I.D.	4 ¼"	1 3/8"		DATE FINISH	10/9/15
HAMMER WT.		140#	BIT	SURFACE ELEV.	
HAMMER FALL		30"		GROUND WATER ELEV.	

GROUND WATER OBSERVATIONS
AT none FT AFTER 0 HOURS
AT __FT AFTER __HOURS

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	Type	PEN	REC.	DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6 / 6 - 12 / 12 - 18	CORE TIME PER FT (MIN)	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
											12" TOPSOIL
5		1	ss	24"	18"	7'0"	5 / 7 8 / 4		dry compact		Red VF SAND & SILT
10		2	ss	24"	16"	12'0"	10 / 12 15 / 15		dry compact		Lt Brn VF-F SAND
15		3	ss	24"	14"	17'0"	8 / 11 16 / 16		dry compact		Lt Brn VF-F SAND, tr brn silt COBBLES at 17'0"
20		4	ss	8"	8"	20'8"	36 / 50/2"		v dense		Lt Brn FM SAND, sm C sand, F gravel
25		5	ss	4"	4"	25'4"	50/4"		dry		Lt Red FMC SAND & SILT, lit gravel, cobbles
30		6	ss	6"	5"	30'6"	70		dry		SAME
35		7	ss	5"	5"	35'5"	50/5"		v dense	35'5"	SAME
											E.O.B. 35'5"
40											

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO _____FT. USED _____CASING THEN _____ CASING TO _____FT. HOLE NO. B-1

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST
WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS C = COARSE
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER M = MEDIUM
PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50% F = FINE

SOILTESTING, INC. 90 DONOVAN RD. OXFORD, CT 06478 CT (203) 262-9328 NY (914) 946-4850	CLIENT: Baldwin & Franklin Architects	SHEET 1 OF 1 HOLE NO. P-1 & P-2
	PROJECT NO. G221-0191-15	
	PROJECT NAME 17 Washington Avenue	BORING LOCATIONS per Plan
FOREMAN - DRILLER BD/bk/md	LOCATION Hasting-on-Hudson, NY	
INSPECTOR		OFFSET
GROUND WATER OBSERVATIONS AT none FT AFTER 0 HOURS AT FT AFTER HOURS	TYPE: CASING FW, SAMPLER SS SIZE I.D.: 4", 1 3/8" HAMMER WT.: 140#, CORE BAR BIT HAMMER FALL: 30"	DATE START 10/9/15 DATE FINISH 10/9/15 SURFACE ELEV. GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO	SAMPLE Type	SAMPLE PEN	SAMPLE REC.	SAMPLE DEPTH @ BOT	BLOWS PER 6 IN ON SAMPLER (FORCE ON TUBE) 0 - 6 / 6 - 12 / 12 - 18	CORE TIME PER FT (MIN)	DENSITY OR CONSIST / MOIST	STRATA CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
5											
10									dry		
15											
20											Set 4" Flush Wall casing at a depth of 20' for percolation testing. Casing cleaned out and placed 3" of coarse sand / fine gravel
25											Perc Test - By Others
30											
35											
40											

NOTE: Subsoil conditions revealed by this investigation represent conditions at specific locations and may not represent conditions at other locations or times.

GROUND SURFACE TO _____FT. USED _____CASING THEN _____ CASING TO _____FT. HOLE NO. P-1 & P-2

A = AUGER UP = UNDISTURBED PISTON T = THINWALL V = VANE TEST

WOR = WEIGHT OF RODS WOH = WEIGHT OF HAMMER & RODS

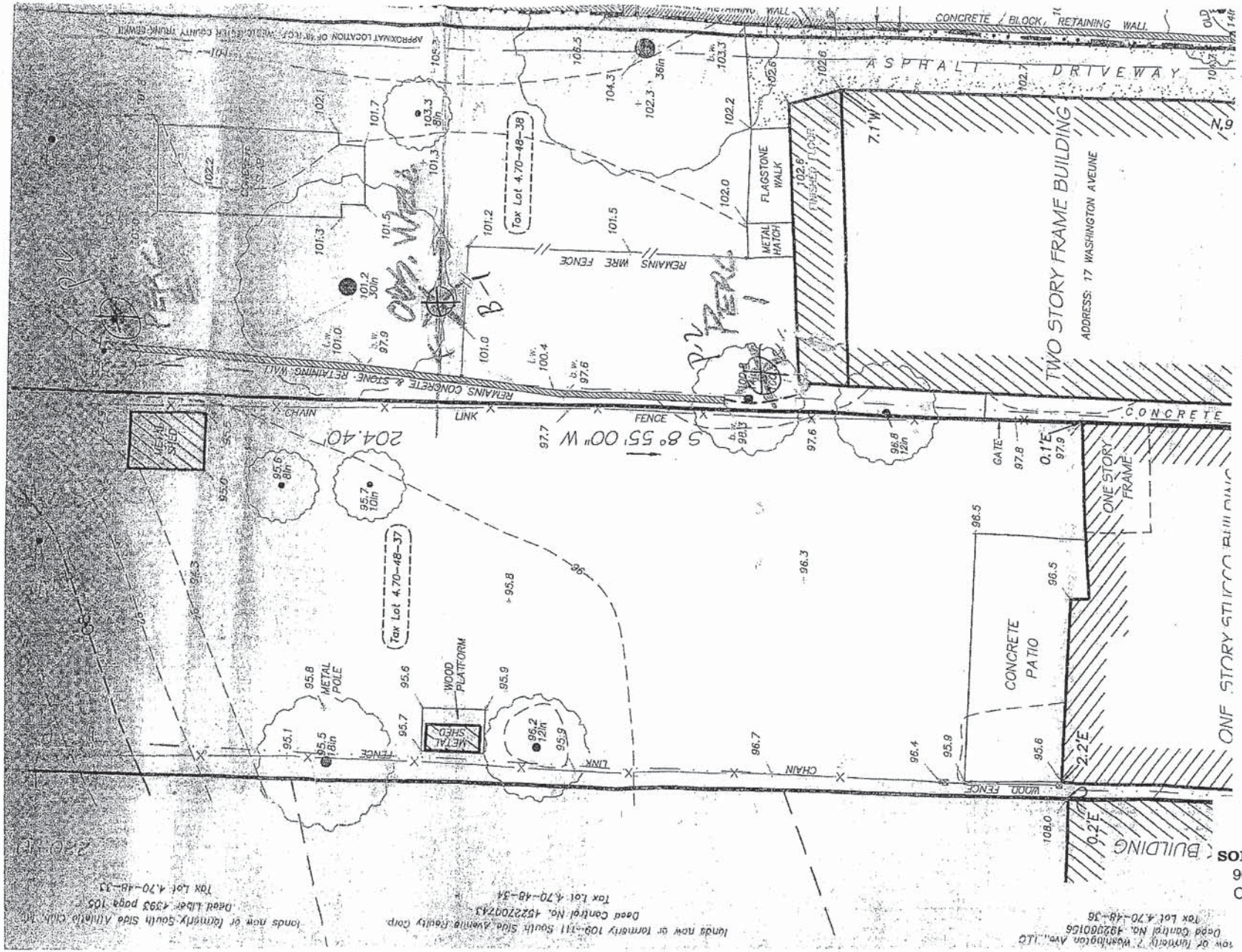
SS = SPLIT TUBE SAMPLER H.S.A. = HOLLOW STEM AUGER

PROPORTIONS USED: TRACE = 0 - 10% LITTLE = 10 - 20% SOME = 20 - 35% AND =35 - 50%

C = COARSE

M = MEDIUM

F = FINE



JOB NO.
G221-0191-15

SOILTESTING, INC.
90 Donovan Road
Oxford, CT 06478

LARRY J. NARDECCHIA JR., P.E.
Consulting Engineer
21 McKinley Place
Ardsley, New York 10502-2403
(914) 693-1126

INFILTRATION TESTS

DATE : October 9, 2015

LOCATION : 17 Washington Avenue Hastings-on-Hudson, N.Y. 10706

CONTRACTOR : Soil Testing Co
90 Donovan Road
Oxford, Conneticut 06478

METHOD : Soil Testing Method : Solid Casing 20 feet long for deep test ; bottom area only

DATA GIVEN : **Test hole #1 Dia. Stand Pipe ~ 20' long ~ 4" I.D.**
Surface Elev. = 101.8 Perc
Test Depth Elev . 81.8

DATA SHEET:

Test Hole #1

Hole	Run	Time START	Time STOP	Depth to Water Start	Depth to Water Stop	Time Elapsed	Drop In Inches	Elevation Start	Elevation Stop
#1	1	9:55 A	10:25 A	16'-5"	16'-8.375"	30 min.	3.375"	85.6	85.32
	2	10:25 A	10:55 A	16'-8.38"	16'-11.88"	60 min	6.625"		85.05
	3	10:55 A	11:25 A	16'-11.88"	17'-2.125"	90 min	9.875"		84.23
	4	11:25 A	11:55 A	17'-2.125"	17'-5.375"	120 min.	13.25"		84.25
Totals						120 Min.	13.25"		

Result :
Infiltration = 6.625 "/ Hour
or 159"/Day
9.06 Minutes per inch

Larry J. Nardecchia **Date Oct. 9, 2015**
Engineer: Larry J. Nardecchia Jr.,P.E.
Test Engineer

Witnessed By : Miguel A. Roche
Miguel A. Roche, Hahn Engineering

LARRY J. NARDECCHIA JR., P.E.
Consulting Engineer
21 McKinley Place
Ardsley, New York 10502-2403
(914) 693-1126

INFILTRATION TESTS

DATE : October 9, 2015

LOCATION : 17 Washington Avenue Hastings-on-Hudson, N.Y. 10706

CONTRACTOR : Soil Testing Co
90 Donovan Road
Oxford, Conneticut 06478

METHOD : Soil Testing Method : Solid Casing 20'long for deep test; bottom area only

DATA GIVEN : **Test hole #2 Dia. Stand Pipe ~ 20' long ~ 4" I.D.**
Surface Elev. = 101.7
Perc. Test Depth Elev . 82.8

DATA SHEET:

Test Hole #2

Hole	Run	Time START	Time STOP	Depth to Water Start	Depth to Water Stop	Time Elapsed	Drop In Inches	Elevation Start	Elevation Stop
#1	1	11:15 A	11:45 A	16'-5"	16'-8"	30 min.	3.5"	86.7	86.41
	2	11:45 A	12:15 P	16'-8"	17'-1"	60 min	3.375"		86.13
	3	12:15 P	12:45 P	17'-1"	17'-6.25"	90 min	3.25"		85.86
Totals						90 min	10.125 "		

Result :

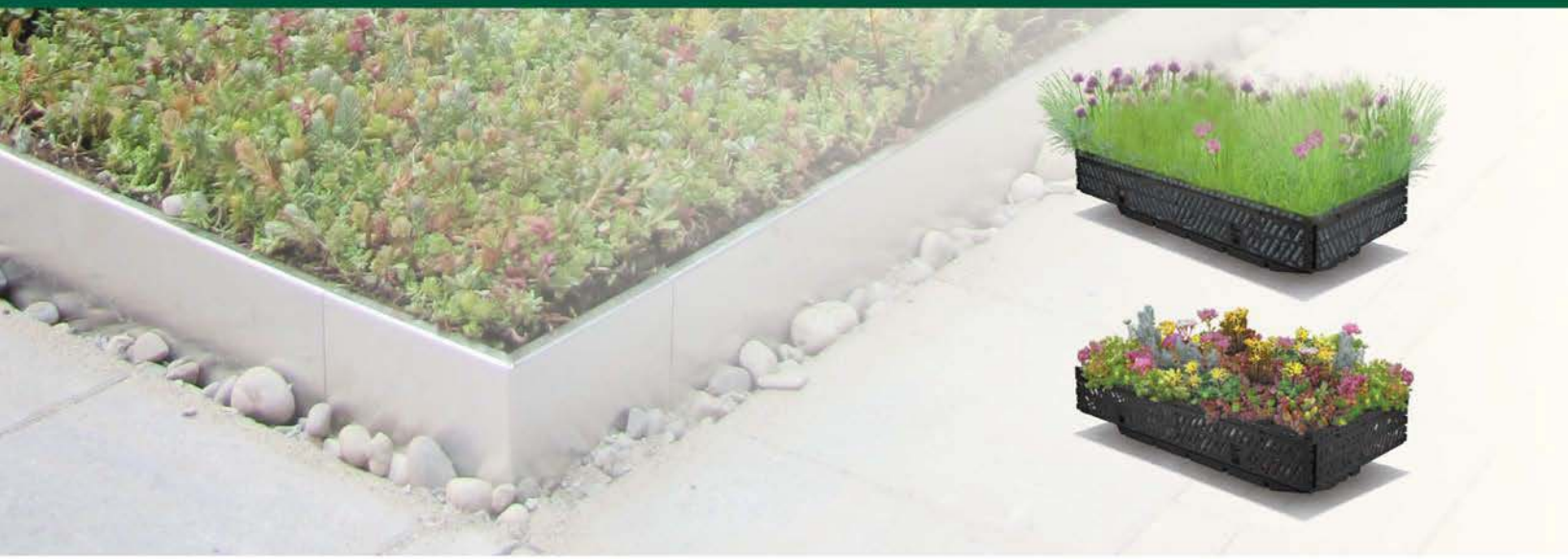
Infiltration = 6.75"/ Hour
or 162"/Day
8.88 Minutes per inch

Engineer: Larry J. Nardecchia Jr.,P.E.
Test Engineer

Witness : Miguel A. Roche, Hahn Engineering

APPENDIX E

GREEN ROOF SYSTEM



SYSTEM PROFILE

VR MOD

EXTENSIVE
PRE-VEGETATED HYBRID MODULAR SYSTEM

HIGH PERFORMANCE.
MODULAR.
PRE-VEGETATED.

INSTANT GREEN ROOF.

SYSTEM OVERVIEW

VR MOD creates an instant green roof, while employing the same high performance qualities as our "built-in-place" systems.

Each unit is designed to encapsulate growing media against erosion into the drainage areas, allow for uninterrupted nutrient, root and water exchange between units, optimally hold and release storm water, and allow for seamless integration of irrigation systems. VR MOD units positively lock together for superior wind uplift resistance and precise integration. Modules can be locked together interchangeably in both vertical and horizontal orientations.

Contained within the VR MOD unit are all the components which make up a well designed green roof system.

STANDARD FEATURES & OPTIONS

- Perforated side walls for soil-to-soil contact throughout the entire depth of the growing media
- Integrated water retention and drainage panel with the highest water retention capacity in the industry
- Positive-locking sidewalls for a secure module-to-module fit, regardless of module orientation
- Standard growing media depths of 4"
- Built-in filtration layer separates growing media from drainage layer
- Standard modules are pre-vegetated with sedum or shortgrass blends. Custom vegetation palettes available.

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ROOFING & BUILDING MAINTENANCE

SYSTEM DETAILS

VR MOD

EXTENSIVE
PRE-VEGETATED HYBRID MODULAR SYSTEM

SYSTEM COMPONENTS

- **A** ROOT BARRIER
- **B** MODULE
  WITH INTEGRATED RETENTION AND DRAINAGE PANEL AND DRAINAGE MAT WITH FILTER FABRIC OVERLAY
- **C** VR MOD SEDUM
  WITH ENGINEERED GROWING MEDIA

  VEGETATION OPTIONS:
  SEDUM BLENDS
- **D** VR MOD MEADOW
  WITH ENGINEERED GROWING MEDIA

  VEGETATION OPTIONS:
  SHORTGRASS MEADOW BLENDS
  WILDFLOWER MEADOW BLENDS
  PERENNIALS
- **E** EDGING RESTRAINT
- **F** VEGETATION-FREE ZONE

TREMCO
ROOFING & BUILDING MAINTENANCE

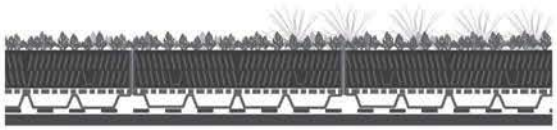
TREMCO
ROOFING & BUILDING MAINTENANCE

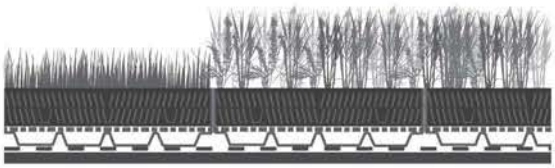
SYSTEM CRITICAL DATA SHEET

VR MOD

EXTENSIVE
PRE-VEGETATED HYBRID MODULAR SYSTEM

ACCESSORIES
ROOT BARRIER
DRAIN INSPECTION BOX
EDGING RESTRAINT
IRRIGATION
SLOPE RETENTION SYSTEM





SYSTEM	VR MOD SEDUM	VR MOD MEADOW
GROWING MEDIA DEPTH	4” 100 MM	4” 100 MM
VEGETATION OPTIONS	SEDUM BLENDS: STANDARD CUSTOM	SHORTGRASS MEADOW BLENDS: STANDARD CUSTOM PERENNIALS
SATURATED WEIGHT	29.5 - 32.0 LB/SQ. FT. 145 - 155 KG/SQ. M.	26.5 - 28.0 LB/SQ. FT. 130 - 137 KG/SQ. M.
STORM WATER RETENTION CAPACITY	1.35 - 1.50 GAL/SQ. FT. 55 - 62 L/SQ. M.	1.65 - 2.20 GAL/SQ. FT. 67 - 90 L/SQ. M.

TREMCO

ROOFING & BUILDING MAINTENANCE

Providing Roofing and Weatherproofing Peace of Mind

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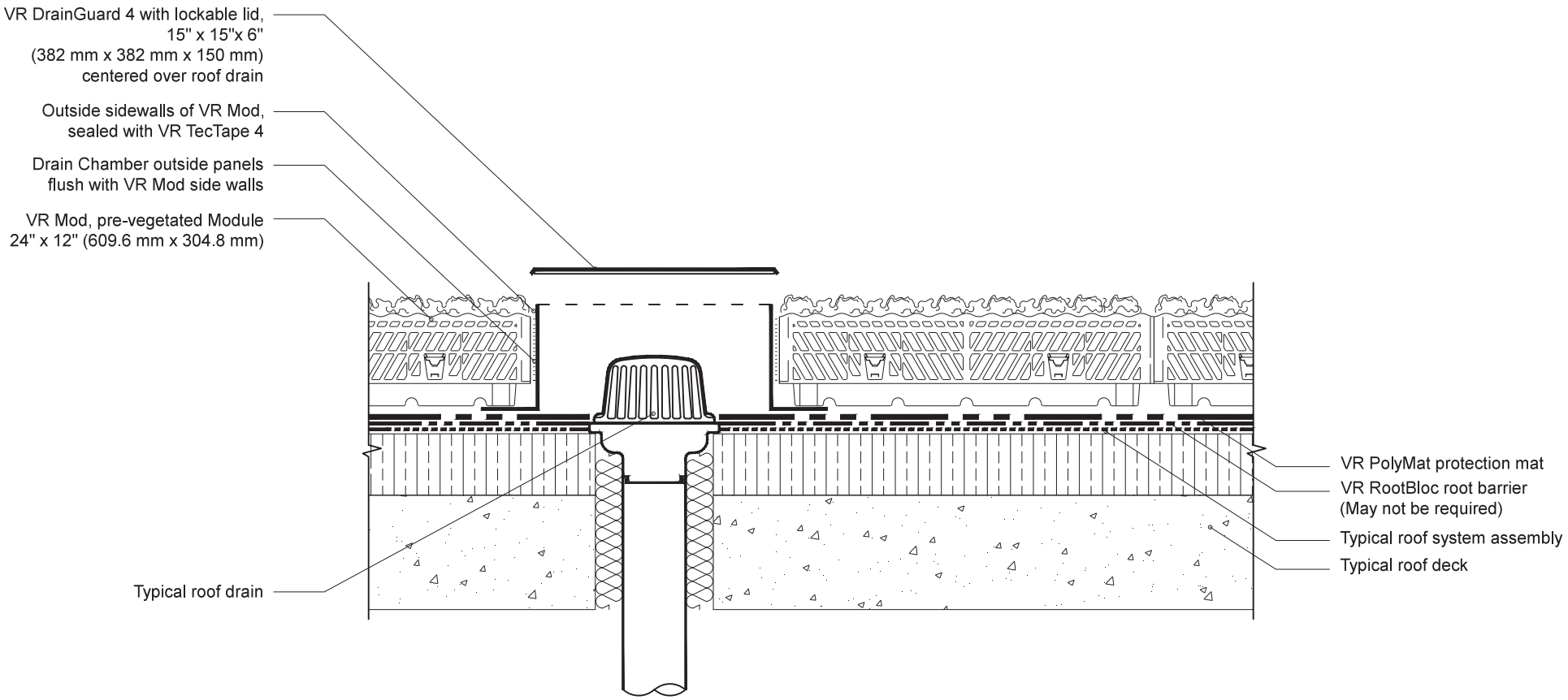
3735 Green Road
Beachwood, Ohio
44122
T: 1.800.562.2728

CANADA
50 Beth Nealson Drive
Toronto, Ontario
M4H 1M6
T: 1.800.668.9879

www.tremcoroofing.com



INSPECTION CHAMBER FOR ROOF DRAINS IN VEGETATED ROOF ASSEMBLY

CONVENTIONAL ROOFS

Scale: 1:10

VR MOD DETAIL

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VEGETATED ROOFING

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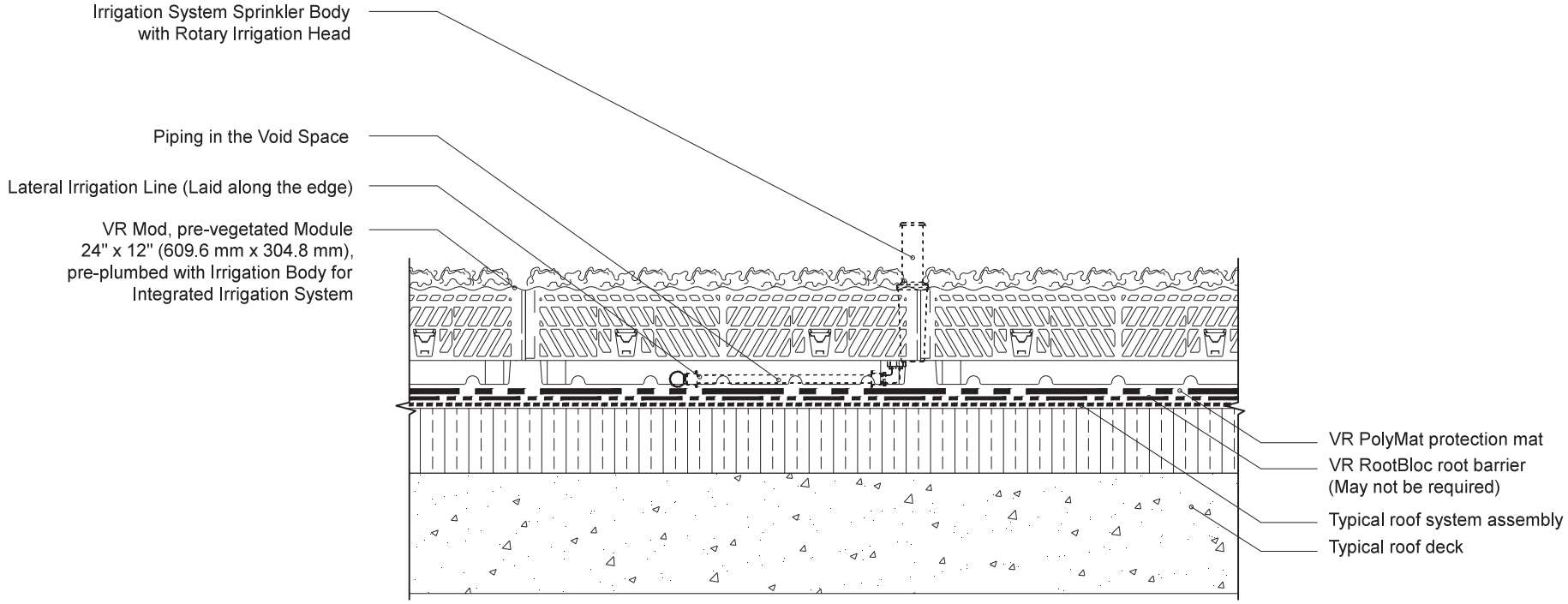

VEGETATED ROOF ASSEMBLY WITH INTEGRATED IRRIGATION SYSTEM

CONVENTIONAL ROOFS

Scale: 1:10

VR MOD DETAIL

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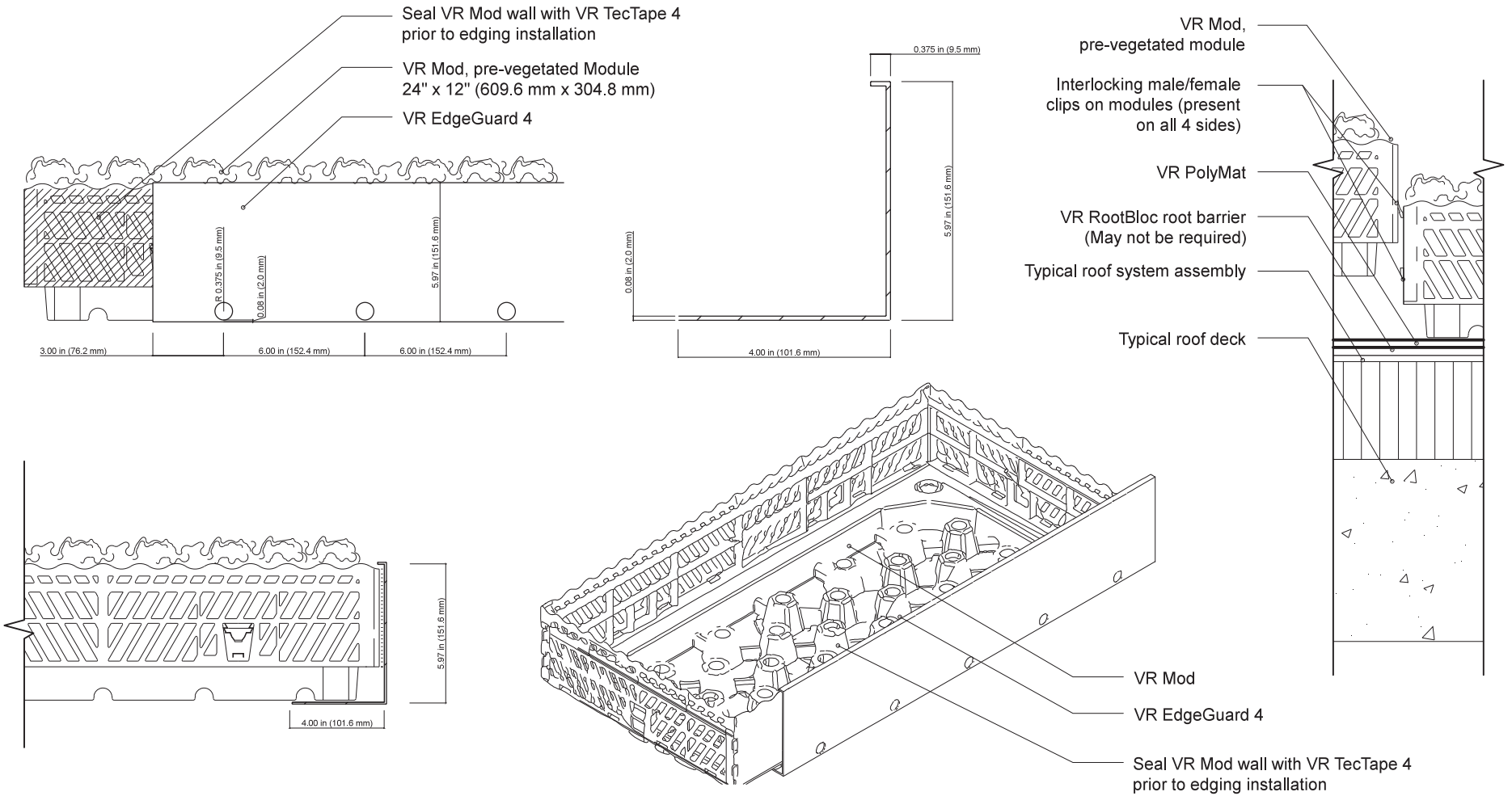

VR MOD DETAILS

CONVENTIONAL ROOFS

Scale: N.T.S.

VR MOD DETAIL

TREMCO
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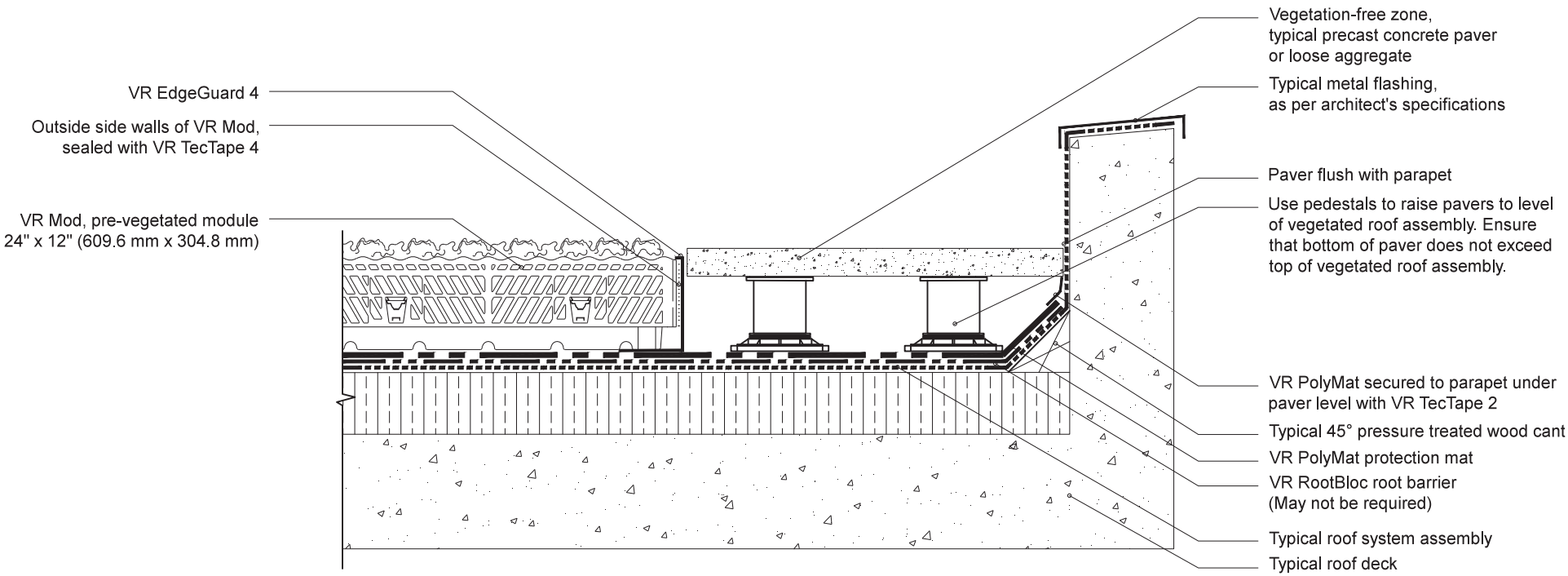

VEGETATED ROOF ASSEMBLY WITH PARAPET & VEGETATION FREE ZONE

CONVENTIONAL ROOFS

Scale: 1:10

VR MOD DETAIL

TREMCO
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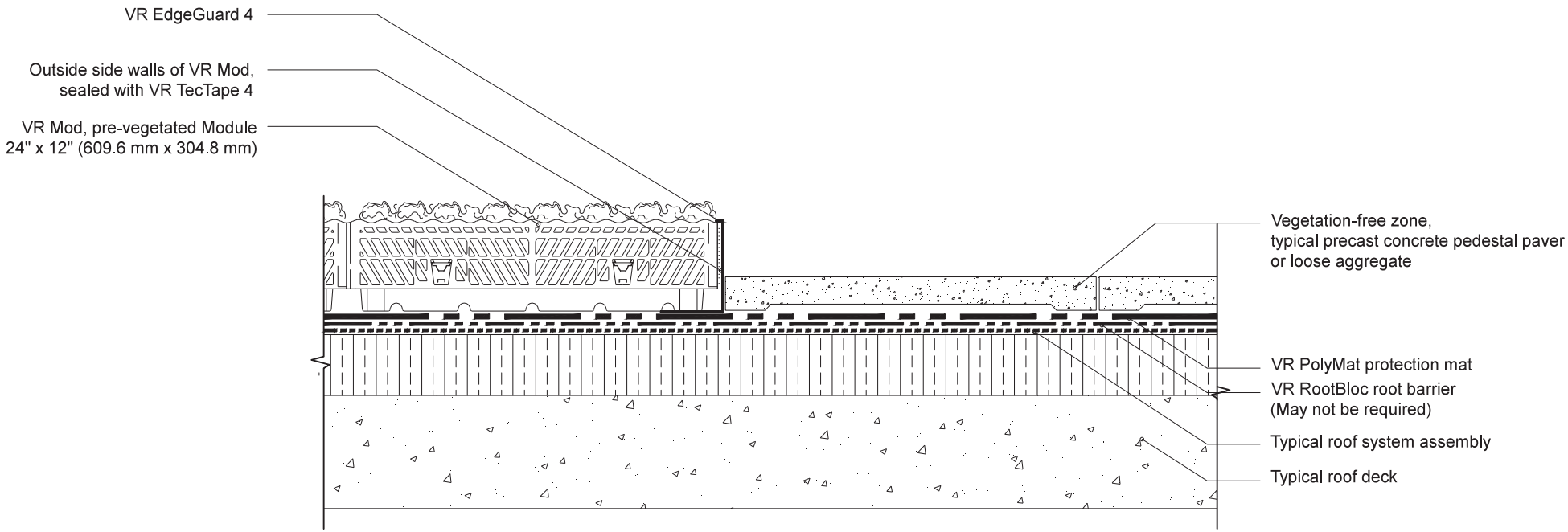

VEGETATED ROOF ASSEMBLY WITH VEGETATION FREE ZONE

CONVENTIONAL ROOFS

Scale: 1:10

VR MOD DETAIL

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REPORT NO.
C11271-7001
ACCOUNT NUMBER
98047

A & L Canada Laboratories Inc.

2136 Jetstream Road, London, ON, N5V 3P5 Tel: (519) 457-2575 Fax: (519) 457-2664

TO: TREMCO ROOFING & BUILDING MAINTENANCE
3735 GREEN ROOD
BEACHWOOD, OH, 44122
UNITED STATES OF AMERICA

50 BETH NEALSON DRIVE
TORONTO, ONTARIO, M4H 1M6
CANADA

Phone: 1.800.562.2728

1.800.668.9879

CERTIFICATE OF ANALYSIS

PROJECT NO:
PO#:
LAB NUMBER: 271702
SAMPLE ID: VR HydraMix

SAMPLE MATRIX:SOLID
DATE RECEIVED:NONE GIVEN
DATE REPORTED:06/05/2015
PAGE:1

PARAMETER	RESULT	UNIT	DETECTION LIMIT	METHOD REFERENCE
Bulk Density (dry weight basis)	0.34	g/cm3	0.10	ASTM E 2399-05
Bulk Density (Dry Weight basis)	21.40	lb/ft3	0.10	ASTM E 2399-05
Bulk Density at max. Water Holding Capacity	1.09	g/cm3	0.10	ASTM E 2399-05
Bulk Density at max. Water Holding Capacity	68.00	lb/ft3	0.10	ASTM E 2399-05
Total Pore Volume	72.00	%	0.10	ASTM F 1815-97
Maximum Water Holding Capacity	74.60	%	0.10	ASTM E 2399-05
Air-Filled porocity at max Water Holding Capacity	15.30	%	0.10	ASTM F 1815-97
Water permeability-saturated hydraulic Cond.	0.013	cm/sec	0.001	ASTM E 2399-05
Water permeability-saturated hydraulic cond.	0.39	in/min	0.10	ASTM E 2399-05
100% Saturation Weight of 1 ft2 X 1 inch	5.70	lb	0.10	ASTM E 2399-05

Results reported on a dry weight basis
BDL - Below detectable levels

Results Authorized By:

James Beswick, Laboratory Supervisor

SECTION 07 33 63 – VEGETATED ROOF ASSEMBLY: PRE-VEGETATED MODULAR

Use this section in combination with a properly formatted Division 07 roofing section and, where required, a membrane leak detection system and irrigation system. To coordinate Work of this Section with the associated roofing system warranty, add vegetated roof assembly (VRA) section to the Division 07 roofing section Part 1 Related Sections paragraph and to the Warranty article.

Edit this section in consultation with a Tremco Vegetated Roof Specialist.

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Additional requirements may be specified in other sections.

1.2 SUMMARY

Edit list below to correspond to content of edited Section.

A. Section Includes:

1. Pre-vegetated modular vegetated roof assembly components.
2. Vegetated roof growing media.
3. Vegetated roof planting material.
4. Vegetation-free zone material.

B. Related Sections:

If retaining this Related Sections paragraph, edit list below to suit Project requirements. Include items that Contractor may normally anticipate would be specified in this Section. Sections cross-referenced within the Section text are not included here.

1. Division 01 Section "Sustainable Design Requirements" for additional LEED requirements.
2. Section 03 41 00 “Precast Structural Concrete.”
3. Division 07 Section "<**insert roofing section name**>" for membrane roofing, roof insulation, and total roofing system warranty including warranty coverage for work of this Section.
4. Section 07 27 11 “Air Barriers – Performance.”
5. Section 07 72 73 "Membrane Leak Detection System."
6. Section 11 24 29 "Facility Fall Protection" for fall protection devices at roof openings and perimeter.
7. Section 22 00 00 “Plumbing.”
8. Section 32 84 15 "Planting Irrigation for Vegetated Roofs."

1.3 DEFINITIONS

A. Vegetated Roof Assembly: Rooftop assembly, to form continuous cover over designed roofing area, composed of single-media system, that is designed to grow plants and to retain and detain rainwater runoff from the roof.

1. Pre-vegetated Modular Vegetated Roof Assembly: Landscape built using an assembly that is modular, consisting of the following fully integrated living and manufactured components:

a. Electronic leak detection.
b. Root barrier.
c. Technical seam tapes.
d. Protection sheet.
e. Horizontal insulation.
f. Drain inspection box.
g. Pre-vegetated modular tray.
h. Edging restraint.
i. [Pre-cast concrete pavers] [Loose aggregate].
j. Erosion control netting.
k. Irrigation.

B. Captured Water: Water that is retained in the drainage layer of a vegetated roof assembly after new water additions have ceased and that cannot escape the roof except through evaporation or plant transpiration.

C. Planted Area; Vegetated Area: Areas to be planted.

D. Vegetation-Free Zone: Areas without plantings.

E. Plant; Plants; Plant Material: Vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

F. Alive: Displaying horticultural viability consisting of vigorous, hardy, and sustainable growth characteristics.

G. Retained Water: Water that is held for a period of hours or days but would eventually drain out given enough time in the absence of evaporation or plant transpiration.

1.4 ACTION SUBMITTALS

A. Submittals in accordance with Section [01 33 00 “Submittal Procedures”].

B. Coordinate submittal requirements and provide submittals required by Section [01 47 15 “Sustainable Requirements: Construction”].

C. Product Data: For each of the components of vegetated roof assembly indicated, including the following:

1. Root barrier and barrier seam tape.
2. Protection sheet.
3. Horizontal insulation.
4. Drain inspection box.
5. Pre-vegetated modular tray.
6. Edging restraint.
7. [Pre-cast concrete pavers] [Loose aggregate].
8. Erosion control netting.
9. Irrigation.

D. US Occupational Health and Safety Administration's (OHSA) Hazard Communications Standard (HCS): Safety Data Sheets (SDS): For each of the following components of vegetated roof assembly:

1. Root barrier.
2. Protection sheet.
3. Modular tray.
4. Edging restraint.
5. Drain inspection box.
6. Erosion control netting.
7. Technical seam tapes.

Specifier: Retain and edit "LEED Submittals" Paragraph for projects pursuing LEED certification; modify provisions if sustainable design submittals are required for non-LEED projects or for Federal projects.

E. LEED Submittals:

1. Product Test Reports for Credit SS 7.2: For paver and aggregate surfacing materials, indicating that materials comply with Solar Reflectance Index requirement.
2. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content. Include statement indicating cost for each product having recycled content.

F. Shop Drawings: For vegetated roof assemblies. Include roof plans, slopes, and drain locations; details of vegetated roof assemblies and accessories[, walkway pavers][, and aggregate surfacing].

1. Indicate planted areas correlated with planting schedule.
2. Coordinate with requirements for membrane leak detection system.

G. Samples for Verification: Two (2) samples for each of the following components of vegetated roof assembly:

1. Root barrier: 12 inch x 12 inch.
2. Protection sheet: 12 inch x 12 inch.
3. Pre-vegetated modular tray: 15 inch x 20 inch.
4. Growing media: 1-quart volume of each growing media, in sealed plastic bags labeled with content and source. Each Sample shall be typical of the lots of growing media to be furnished. Provide an accurate representation of texture and composition.

1.5 INFORMATIONAL SUBMITTALS

A. Installer's Certificate: For vegetated roof assembly Installer and irrigation system Installer, verifying qualifications on company letterhead.

B. Manufacturer's Certificate: For specified products of vegetated roof assembly, signed by Manufacturer, verifying approval of Installer.

C. Product Testing Data: Based on evaluation of comprehensive tests conducted on specified products by the following independent testing agencies:
1. Test reports from a certified laboratory for ASTM E 2399-05: For growing media.

D. Manufacturer Field Inspection Reports: Manufacturer's written reports and acceptance of vegetated roof assembly Installer based on regular inspections. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.

E. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended maintenance plan including procedures for inspection and care of vegetated roof assembly and plants during a calendar year. Submit before start of required warranty and maintenance periods.

B. Maintenance Reports: Reports of vegetated roof assembly Inspector submitted quarterly. Must be signed by approved representation of vegetated roof assembly Installer, must outline actions carried out as per Maintenance Requirements.

1.7 QUALITY ASSURANCE

A. Vegetated Roof Assembly Installer Qualifications: A qualified Installer, certified by vegetated roof assembly Manufacturer, whose work has resulted in successful establishment of plants.
1. Experience: [**Three**] years' proven experience in vegetated roof assembly installation in addition to requirements in Section 01 40 00 "Quality Requirements."
2. Training: Staff trained to facilitate maintenance of vegetated roof assembly.
3. Fall Protection: Fall Arrest Certificates maintained by all employees of Installer when working on roof top.
4. Installer's Field Supervision: Maintain experienced full-time supervisor on Project site when work is in progress.

B. Vegetated Roof Assembly Manufacturer Qualifications: A qualified company, specialized in supplying vegetated roof assembly systems.

1. Experience: [**Five**] years' experience in supplying vegetated roof assemblies.

C. Source Limitations: Obtain vegetated roof assembly components and roof membrane specified in Division 07 roofing membrane section from single source from single manufacturer.

D. Mock-Up: Build mock-ups to set quality standards for materials and executions.
1. Build mock-up of vegetated roof assembly and associated components and accessories.
2. Size: 100 sq. ft. (9.25 sq. m.), 10 ft. x 10 ft. (3.048 m x 3.048 m) to demonstrate assembly installation and standard of workmanship.
3. Subject to compliance with requirements, approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Electronic Testing: Perform leak testing by installation of Electro Field Vector Mapping (EFVM) system administered by a qualified testing agency. Flood testing is unacceptable as a testing procedure.

F. Health and safety: Perform in accordance to Health and Safety Requirements.

G. Pre-Installation Conference: Conduct conference at Project site [one] week prior to beginning [work of this Section] [and] [on-site installations] in accordance with Section [01 32 16.06 "Construction Progress Schedule – Critical Path Method (CPM)"].
1. Coordinate: Requirements and procedures related to roof deck and roofing system construction:

a. Participants: authorized representatives of Contractor[, Construction Manager], [Owner,] Consultant, Roofing Subcontractor, Roofing Manufacturer, vegetated roof assembly Manufacturer, vegetated roof assembly Installer.
b. Vegetated Roof Assembly: Review methods and procedures, including Manufacturer's written installation instructions.
c. Construction Schedule: Review and confirm availability of products, Subcontractor personnel, equipment, and facilities.
d. Conformance: Review roofing membrane type and vegetated roof assembly criteria.
e. Structural Load: Review limitations of roof deck, identifying loading areas for storage. Obtain structural report from Consultant certifying dead load weight restrictions for entire assembly.
f. Roof Details: Review flashing, drains, penetrations, equipment curbs, and other conditions.
g. Regulations: Review, including necessary insurance and/or certificates.
h. Safety: Review requirements, including Fall Protection requirements.
i. Quality Control: Review procedures and policy.
j. EFVM: Obtain report certifying roof is watertight.
k. Coordinate: related work specified in other Sections.
l. Inspection: Review Manufacturer's procedure for warranty.
m. On-site traffic: Review limits by other trades on vegetated roof assembly and procedures for compensation due to damage.
n. Meeting minutes: Taken by representative of Consultant and distributed to all parties within 24 hours of meeting date.
o. Photographic records: Taken by Contractor prior to commencement of Work.

1.8 PROJECT FIELD CONDITIONS

A. Product Handling: Deliver and store products in original packaging with Manufacturer's labels and materials list intact and signed off, elevated from ground and protected from environmental damage within designated weather protected areas. Avoid storage of products on site to prevent contamination.

B. Pre-vegetated Modular Tray Handling: Install pre-vegetated modules immediately upon delivery to site.

C. Installation:
1. Pre-vegetated Modular Tray: According to optimal conditions, conducive to plant establishment and survival based upon local hardiness zone as defined by USDA.
2. All other components of vegetated roof assembly: At any time, adequate protection should be provided to prevent damage and erosion.

D. Foot Traffic: Prohibited on vegetated roof assembly during vegetation establishment period and thereafter except for vegetated roof maintenance purposes.

1.9 SUSTAINABLE CONDITIONS

A. Waste Management: Handle in accordance with Waste Management Plan, reviewed by [Departmental Representative] [DCC Representative] [Consultant]. Divert from landfill when possible. For the following waste materials: collect, separate, remove from site, [reuse,] [recycle,] and dispose of at appropriate facilities:

1. Paper, corrugated cardboard, plastic, polystyrene, packaging materials.
2. Metal: Fold up, flatten, place in designated area, divert from landfill to local facility for recycling.
3. Aggregate: Divert from landfill to local facility for reuse.
4. Gypsum: Divert from landfill to local facility for recycling.
5. Hazardous materials: Place in designated containers, handle and dispose of in compliance with [EPA] [and] [Regional and Municipal] regulations. Clearly label location of salvaged material's storage areas and provide barriers and security devices. Ensure emptied containers are sealed and stored safely. Unused materials must be disposed of at official hazardous material collection sites:
a. Paint, coating materials.

b. Adhesive, sealant, and asphalt materials: Shall not be disposed of into sewer system, streams, lakes, onto ground, or in other location where it will pose health or environmental hazard.

B. Concept Design Strategy Requirements: An integral part of the Work as detailed in Section [01 47 13 “Sustainable Requirements: Concept Design”], including the following sustainable design concepts:

1. Holistic green design framework.
2. Descriptions of design criteria.
3. Sustainable goals based on project design decisions, delineated with measurable performance targets.
4. Operational requirements: Specified to transform design requirements into physical requirements.

C. Construction Requirements: An integral part of the Work as detailed in Section [01 47 15 “Sustainable Requirements: Construction”], including the following sustainable construction requirements:

1. Construction requirements: specific to project.
2. Specification text: Ensure that project will comply with green design process and sustainability requirements.
3. Administrative, temporary, procedural requirements: For use of materials and methods of construction.

D. Contractor Verification: An integral part of the Work as detailed in Section [01 47 17 “Sustainable Requirements: Contractor’s Verification”], including the following verification requirements:

1. Performance Verification: As specified in Section [01 47 15 “Sustainable Requirements: Construction”]
2. Compliance: Sustainable requirements specific to this technical section.

E. Operation and Maintenance Requirements: An integral part of the Work as detailed in Section [01 47 19 “Sustainable Requirements: Operation”], including the following operation requirements:

1. Products, materials, services, and methods: Consistent with procurement policy of eco-purchasing that reduces volume of wastes, material costs, toxicity of products and supports recycling.

1.10 WARRANTIES

Specifier: Retain "Roof System Warranty, General" Paragraph below when roofing system warranty is a comprehensive document that incorporates VRA warranty and is specified in the roofing system Section.

A. Roof System Warranty, General: Warranties specified in this Section are components of the roofing system warranty specified in other sections supplied by the roofing system Manufacturer, and installed by the roofing system Installer:
1. Refer to Division 07 roofing membrane section for roofing system warranty and continuing maintenance service requirements, including warranty requirements of other specification sections referenced in roofing system warranty.

B. Special Warranty for Vegetated Roof Assembly: Provide manufacturer's standard warranty in which Manufacturer and Installer jointly agree to repair or replace vegetated roof assembly and components, including root barrier, membrane protection sheet, percolation/retention and drainage layer, geotextile filter fabric layers, horizontal insulation, and engineered growing media, and excluding plant materials covered under separate warranty below, that fail in materials or workmanship within specified warranty period.
1. Failure includes, but is not limited to, ponding water or prolonged wetness of growing media caused as a result of failure of the assembly to properly drain.

2. Manufacturer's warranty applies to Projects installed by Manufacturer-approved Installer and inspected by Manufacturer Technical Representative.
3. Warranty Period: [20] years from date of Substantial Completion.

C. Special Warranty for Plant Growth: Provide manufacturer's standard warranty in which Manufacturer and Installer jointly agree to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
1. Groundcover Foliage Cover: Plantings shall grow to achieve and maintain at least [85] percent foliage cover over planting area, when averaged within 2 square foot increments, commencing with installation, at the end of the warranty period. Provide extended warranty for remainder of original warranty period for replaced plant material.
2. **Herbaceous Perennials, Ornamental Grasses, and Vines**: Plantings shall grow to achieve and maintain at least [75] percent horticultural viability over planting area commencing with installation, through the duration of this warranty. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
3. Failures include, but are not limited to, death and unsatisfactory growth of plant materials except for defects resulting from abuse, neglect by Owner, or incidents that are beyond Contractor's control.
4. Warranty Periods from Date of Installation:
   a. Ground Covers: [Two] years.
   b. Herbaceous Perennials, Ornamental Grasses, and Vines: [Two] years.
   c. Woody Plants and Shrubs: [Two] years.

D. Special Warranty for Specimen Trees, Woody Plants, and Shrubs: Refer to Section 32 93 00 "Plants."

E. Special Warranty for Membrane Leak Detection System: Refer to Section 07 72 73 "Membrane Leak Detection System."

F. Special Warranty for Irrigation System: Refer to Section 32 84 15 "Planting Irrigation for Vegetated Roof."

1.11 MAINTENANCE SERVICE

A. Initial Maintenance Service for Plant Materials: Provide maintenance and general housekeeping of vegetated roof assembly by competent employees of vegetated roof assembly Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than the following maintenance period:
1. Site Visits: Provide not less than three site visits per year to perform required tasks under this Service. Provide one site visit during Year Two by a qualified Manufacturer’s representative.
2. Growing Media Testing and Amending: Perform testing during second year of initial maintenance period and apply amendments to growing media as required. Comply with local watershed authority stormwater nutrient run-off restrictions.
3. Include the following remedial actions as a minimum:
   a. During inspection, remove dead plants and replace unless required to plant in the succeeding planting season.
   b. Replace plants that are more than [25] percent dead or in an unhealthy condition at end of warranty period. Trim plants and remove weeds. Provide supplemental water if required at time of inspection and service.
   c. Reports: Provide written report to Owner including health assessment of plant material and growing media and indication of work performed with each site visit.
4. Initial Maintenance Period: Equal to warranty period under "Special Warranty for Plant Growth" Paragraph above.

B. Continuing Maintenance Service: Provide maintenance and general housekeeping of vegetated roof assembly by competent employees of vegetated roof assembly Installer. Manufacturer's standard continuing maintenance agreement, commencing on date initial maintenance service under warranty is concluded. Include the following:

1. Site Visits: Provide not less than three site visits per year to perform required tasks under this Service.
2. Growing Media Testing and Amending: Perform testing annually and apply amendments as required.
3. Supplemental Water: Add supplemental water as required to bring growing media up to recommended moisture content levels. Inform Owner of recommended adjustment to Owner's watering practices.
4. Weeding and Plant Material Housekeeping: Remove dead and damaged growth and weeds and debris. Dispose of debris onsite in Owner's container.
5. General Housekeeping: Perform general rooftop housekeeping in accordance with requirements in Division 07 roofing section.
6. Reports: Provide report to Owner including health assessment of plant material and growing media, and indication of work performed, with each site visit.
7. Continuing Maintenance Period: [20] years from date of substantial completion.

PART 2 - PRODUCTS

2.1 SYSTEM SUPPLIER

A. Supplier of vegetated roof assembly having systems and/or products approved for use:

1. VR Mod Vegetated Roof Assembly System by Tremco Inc., www.tremcoroofing.com

2.2 PERFORMANCE REQUIREMENTS

A. Vegetated Roof Assembly: Provide vegetated roof assembly that will support vegetation, having an average coverage of not less than 85 percent coverage of the growing media upon installation.

Specifier: The Water Capacity potential is determined by factoring the type of plant material, soil depth, and drainage.

B. Water Capacity: Provide pre-vegetated modules with a minimum water retention capacity of 1.4 gal/sq. ft. (60L/sq. m). Calculations must include the combined water retention capacity of the growing media and modular tray. For growing media, the water retention capacity is calculated by using the difference between dry and saturated weight as per ASTM E 2399-05. For the modular tray, the water retention capacity is found when measured in accordance with ASTM E 2398-11.

Specifier: Coordinate requirement in "Drainage" Paragraph below with design of roof drain system and site stormwater management system.

C. Drainage: Provide vegetated roof assembly with rainfall drainage capacity not less than 22 in./hr. (55 cm/hr). Rainfall drainage capacity based on saturated hydraulic conductivity of growing media in accordance with ASTM E 2399-05.

When providing for a single VRA type, system superimposed dead load may be specified here; however, project structural engineers will typically indicate such special loading directly on Drawings, as authorities having jurisdiction typically require. When multiple VRA types are required in Project, locations of each and their respective superimposed dead loads must be shown on Drawings.

Do not duplicate drawing information in specifications. Coordinate loading requirements with Structural Engineer.

D. Structural Design Load: Provide vegetated roof assembly with superimposed dead load not exceeding[**___ lb/sq. ft. (___ kg/sq. m)**] [**load indicated on Drawings**]. Calculations must be based on saturated weight of all components of vegetated roof assembly and maximum media density at saturation of growing media in accordance with ASTM E 2399-05.

E. Growing Media: Provide growing media that meets the following characteristics for the VR Mod system specified:

1. VR Mod Sedum:
   a. Depth: Not less than 4 inches (100 mm) [As indicated on Drawings].

2. VR Mod Meadow:
   a. Depth: Not less than 4 inches (100 mm) [As indicated on Drawings].

F. Vegetation:

1. Source Location: Locally to project site, within 500 mile (800 km) radius.
2. Verification: Ensure compatibility to growing media by Manufacturer prior to acceptance.

G. Sustainability: All components must be made from 100% recycled materials.

2.3 VEGETATED ROOF ASSEMBLY COMPONENTS

Specifier: Retain one of two "Root Barrier" paragraphs below based on project requirements; delete if installing over membrane approved for use as a root barrier by manufacturer.

A. **Root Barrier**: Heavy-duty re-inforced polymer film, four-ply laminate with high strength cord grid, flame-retardant. Use with Manufacturer's recommended technical seam tape.
1. Basis of Design Product: **Tremco, Inc., VR RootBloc 10.**
2. Physical Properties:
   a. Thickness: 10 mil (0.25 mm)
3. Mechanical Properties:
   a. Elongation at break, ASTM D 7003: 500%.
   b. 1" Tensile Strength, ASTM D 7003: 60 lbf/in (267 N/cm).
   c. Grab Tensile Strength, ASTM D 7004: 80 lbf (356 N).
   d. Trapezoid Tear, ASTM D 4533: 52 lbf (231 N).
   e. Hydrostatic Resistance, ASTM D 751: 74 psi (510 kPa).
   f. Mullen Burst, ASTM D 751: 90 psi (621 kPa).
4. Flame Spread Index-Class "A", ASTM E 84: 5.

B. **Root Barrier**: Heavy-duty blended linear polyethylene membrane, infused with carbon black additive for UV resistance. Use with Manufacturer's recommended technical seam tape.
1. Basis of Design Product: **Tremco, Inc., VR RootBloc 40.**
2. Physical Properties:
   a. Thickness: 40 mil (1.00 mm).
3. Mechanical Properties:
   a. Elongation at break, ASTM D 6693: 800%.
   b. 1" Tensile Strength, ASTM D 6693: 154 lbf (270 N).
   c. Tear Resistance, ASTM D 1004: 22 lbf (98 N).
   d. Puncture Resistance, ASTM D 4833: 60 lbf (267 N).
   e. Mullen Burst, ASTM D 751: 220 psi (1517 kPa).

Specifier: Retain "Protection Sheet" paragraph below for projects where a conventional roofing membrane configuration is used.

C. **Protection Sheet**: Polyester membrane protection sheet made from 100% post-consumer recycled fibers.

1. Basis of Design Product: **Tremco, Inc., VR PolyMat**.
2. Physical Properties:

a. Thickness: 60 mil (1.52 mm).
b. Weight, ASTM D 3776: Minimum, 4.5 – 5 oz./sq. yd. (160 g/sq. m).

3. Mechanical Properties:
a. Elongation, ASTM D 4632 : 50%.
b. Grab Tensile Strength, ASTM D 4632 : 100 lbf (444 N).
c. Trapezoid Tear, ASTM D 4533 : 45 lbf (200 N).
d. Puncture Strength, ASTM D 4833 : 65 lbf (288 N).
e. Mullen Burst, ASTM D 3786 : 210 psi (1448 kPa).
f. UV Resistance, ASTM D 4355 : 70%.

4. Hydraulic Properties:
a. Water Retention, ASTM F 726-06: 0.05 gal/sq. ft. (2.02 L/sq. m).

Specifier: Retain "Horizontal Insulation" paragraphs below for projects where a protected roofing membrane configuration is used.

D. **Horizontal Insulation:** Extruded-polystyrene board insulation, ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84, unfaced; fabricated with shiplap or channel edges and with side facing Protection sheet having grooved drainage channels.

Specifier: Retain one or both of two subparagraphs below based on project requirements for compressive strength. If retaining more than one, indicate location of each on drawings or by inserted description.

1. Type VI, 40 psi (276 kPa).
2. Type VII, 60 psi (414 kPa).
3. Thickness: As indicated on Drawings.

Specifier: Retain one of two "VR Mod Sedum Pre-Vegetated Modular Tray" or "VR Mod Meadow Pre-Vegetated Modular Tray" paragraphs below depending on plant selection.

E. **VR Mod Sedum Pre-Vegetated Modular Tray:** Modular unit, pre-vegetated with sedum plantings, that includes growth media, and a permanent water retention and drainage layer, above which is situated an integrated filter fabric barrier. Also includes a built-in positive locking mechanism to attach the modules together, consisting of 100% recycled content.

1. Basis of Design Product: **Tremco Inc., VR Mod Sedum Pre-Vegetated Modular Tray**.
2. Modular Tray:
a. Physical Properties:
1) Tray Dimensions: 12 in x 24 in x 5.75 in (305 mm x 610 mm x 146 mm).

F. **VR Mod Meadow Pre-Vegetated Modular Tray:** Modular unit, pre-vegetated with forbs and graminoid plantings, that includes growth media, and a permanent water retention and drainage layer, above which is situated an integrated filter fabric barrier. Also includes a built-in positive locking mechanism to attach the modules together, consisting of 100% recycled content.

1. Basis of Design Product: **Tremco Inc., VR Mod Meadow Pre-Vegetated Modular Tray**.
2. Modular Tray:
a. Physical Properties:
1) Tray Dimensions: 12 in x 24 in x 5.75 in (305 mm x 610 mm x 146 mm).

G. **Technical Seam Tape**: Self-adhered, waterproof membrane with acrylic pressure sensitive adhesive.

1. Basis of Design Product: **Tremco Inc., VR TecTape 2, VR TecTape 4**.
2. Physical Properties:
a. Thickness: 9.9 mil (0.25 mm).

3. Mechanical Properties:
   a. Nail Sealability, ASTM E 331/547 (per AAMA 711-07, Annex 1): Pass both before and after thermal cycling.

Specifier: Choose stainless steel option for **VR DrainGuard 4** if installing in a coastal area where salt contamination may occur.

H. **Drain Inspection Box**: Manufacturer's standard drain inspection box formed from aluminum, with lockable lid and perforated at drainage course level.

1. Basis of Design: **Tremco Inc, VR DrainGuard 4**.
2. Physical Properties:
   a. Thickness: 60 mil (1.52 mm).
   b. Dimensions: 15 in x 15 in (375 mm x 375 mm).
   c. Height: 6 in (152 mm).
   d. Perforations, diameter: 3/4 in (19 mm).

Specifier: Choose stainless steel option for **VR EdgeGuard 4** if installing in a coastal area where salt contamination may occur.

Specifier: Edging may be required depending on type of vegetation-free zone. Edging is not required when pavers are used, but is required when loose aggregate is used.

I. **Edging Restraint**: Manufacturer's standard L-shaped edging with top lip, formed from extruded aluminum. Solid at growing layer to prevent rooting and plant growth through the edging. Perforated at drainage course level to allow for free drainage. Use with Manufacturer's edging restraint connector.

1. Basis of Design: **Tremco, Inc., VR EdgeGuard 4**.
2. Physical Properties:
   a. Thickness: 80 mil (2.03 mm).
   b. Height: 5.97 in (151.64 mm).
   c. Flange Length: 4 in (101.60 mm).
   d. Length: 8 ft (2.5 m).
   e. Lip: 3/8 in (9.525 mm).
   f. Perforations, diameter: 3/4 in (19 mm).

2.4 VEGETATED ROOF GROWING MEDIA

A. Growing Media: Vegetated roof assembly manufacturer's engineered growing media, provided with pre-vegetated modular unit.

2.5 VEGETATED ROOF PLANTING MATERIALS

A. Planting Materials, General: Provide plant materials of types indicated.

B. Pre-vegetated Modular Tray Planting Materials:

Specifier: Retain one or two or all of three paragraphs "VR Mod Sedum" or "VR Mod Meadow" below based on project design for VRA.

1. **VR Mod Sedum**: Sedum species that are healthy, vigorous, well-rooted, consisting of a minimum of 5 varieties.

2. **VR Mod Meadow**: Forbs and graminoid species that are healthy, vigorous, well-rooted specimens.

2.6 VEGETATION-FREE ZONE MATERIALS

Specifier: Retain one or both of two paragraphs “Walkway Roof Pavers” or “Aggregate Ballast” below based on project design for vegetation-free zone.

A. **Walkway Roof Pavers**: pre-cast concrete pavers with pedestals.

1. Basis of Design: **Armtec, Pedslab**.
2. Physical Properties:
   a. Size: 24 in x 24 in (610 mm x 610 mm).
   b. Thickness: 2-1/4 in (57 mm).
   c. Weight: 11 lb/sq. ft. (54 kg/sq. m), minimum.
   d. Colors and Textures: natural color with shot blast finish.
3. Mechanical Properties:
   a. Compressive Strength: 8000 psi (55 MPa), minimum.
   b. Absorption: 5%, maximum.
   c. Freeze-thaw Resistance: 1.0% loss in weight after 40 cycles, maximum.

Retain one of two "Paver Supports" subparagraphs below for paver supports, which are used to elevate pavers and facilitate drainage, if required. Retain first subparagraph if paver supports are integrally cast. Retain second subparagraph if separate pedestal supports, which are used to space, level, and stabilize pavers, are required. Pedestals may be of fixed height or adjustable for leveling pavers over a sloped substrate.

4. Paver Supports: Integral pedestals.
5. Paver Supports: Paver manufacturer's standard SBR rubber, high-density polyethylene, or polyurethane paver support assembly, including [**fixed-height**] [**adjustable or stackable**] pedestals, shims, and spacer tabs for joint spacing of 1/8 to 3/16 inch (3 to 5 mm).

Specifier: Selection of aggregate ballast requires use of edging restraint.

B. **Aggregate Ballast**: ASTM D 1863, No. 6 or No. 67, clean, dry, opaque, water-worn gravel, free of sharp edges.

1. Size: ASTM D 448, Size 4, 3/4 to 1-1/2 inches (19 to 38 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and report any adverse conditions which may negatively impact appearance or performance of vegetated roof system. Ensure all unacceptable conditions are corrected before proceeding.

1. Verify that roof insulation over membrane roofing is in place, secure, and flush along all seams.
2. Verify that perimeter and other flashings are in place and secure along entire lengths where they will be covered by vegetated roof assembly.

B. Ensure adequate provisions have been made for loading, unloading, storage, parking and access to roof site.

C. Execute work in accordance with the specification, drawings and details.

D. Report any imbedded object or obvious damage to Consultant.

E. Ensure all equipment is in good working order. Protect all equipment that comes into contact with roofing membrane, flashings and related work.

F. Ensure adequate safety equipment has been obtained for all operations.

G. Test roof membrane in accordance with procedures of manufacturer of system specified in Section 07 72 73 "Membrane Leak Detection System."

H. Proceed with installation of vegetated roof assembly only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Protect structures, utilities, sidewalks, pavements, and other facilities and areas from damage caused by installation.

B. Protect roofing according to Manufacturer written recommendations to prevent damage and wear during examination, testing, installation, and remainder of construction period.

Specifier: Retain components listed in "Vegetated Roof Assembly Installation" paragraphs below that are required for specific installation; delete unneeded items. Coordinate with products retained in Part 2.

3.3 VEGETATED ROOF ASSEMBLY INSTALLATION

A. Installation, General: Install vegetated roof assembly components according to Manufacturer's written instructions and approved shop drawings.

B. Root Barrier:

1. Place root barrier continuously over finished membrane surface, including all vertical surfaces and projections.
2. Overlap all side and end laps a minimum of 4 inches (100 mm) and seal with Manufacturer’s technical tape. Allow for root barrier to reach up all verticals 1-inch (25 mm) above the intended growing media line and secure with Manufacturer’s technical tape.

C. Protection Sheet:

1. Install protection sheet where indicated, in continuous installation over root barrier.
2. Overlap all side and end laps a minimum of 4 inches (100 mm) and seal with Manufacturer’s technical tape.
3. Extend fabric 1-inch (25 mm) above ballast at perimeter and penetrations. Do not cover drains or restrict water flow to drains.

D. Horizontal Insulation:

1. Loosely lay insulation in parallel courses, staggering end laps and side laps. Abut edges and ends between units.
2. Cut insulation to fit neatly at projections and terminations with less that 1-inch (25 mm) tolerance.

E. Drain Inspection Box:

1. Install inspection box centered over drains directly on the insulation board/protection sheet. Ensure the bottom inner edge of the inspection box is outside of the outer edge of the drain flange.
2. Install filter fabric over vertical drains and over lip of inspection box.
3. Cut slits in fabric to fit around locking pins and adhere to top inside edge with Manufacturer’s technical tape.

F. Pre-Vegetated Modular Trays:

1. Install modular trays on roof surface, working top to bottom and left to right while locking modules together.

Specifier: Retain following paragraph if integrated irrigation is used with VRA.

2. Insert lateral lines of irrigation system into quick-fit couplers on outside edge of pre-plumbed modular trays as per irrigation drawings.
3. Run lateral irrigation lines as per plans and drawings and connect to sprinkler head fittings accessible on underside of pre-plumbed modular tray. Ensure irrigation piping is laid in the void space along the edge of the pre-vegetated modular tray prior to connecting the next pre-vegetated modular tray.
4. Ensure side walls of modules on outside perimeter of vegetated areas are clean and dry.
5. Seal side walls on outside perimeter of vegetated areas with Manufacturer’s 4-inch technical tape.

G. Edging Restraint:

1. Install edging along perimeter border between vegetation-free area and vegetated area, according to Manufacturer’s instructions and approved shop drawings.
2. When joining two sections together, ensure a tight fit at all joints. Remove backing from edge connector and apply to overlap both ends of joints. Press firmly.
3. At corners, cut and bend as required for clean, mitered finish.
4. Ensure base flange is pointed towards the vegetated areas and sits beneath pre-vegetated modules.

3.4 VEGETATION-FREE ZONE INSTALLATION

A. Roof Pavers: To roofed area, place geotextile fabric over insulation and cut to fit. Install roof pavers over geo-textile fabric. Push pavers against edging and ensure there is a tight fit between parapet wall and edging.

1. Install roof pavers on paver supports set according to Manufacturer's written instructions.
2. Tolerances:
   a. Install pavers to vary not more than 1/16 inch (1.59 mm) in elevation between adjacent pavers and not more than 1/16 inch (1.59 mm) from surface plane elevation of individual paver.
   b. Maintain tolerances of paving installation within 1/4 inch (6.35 mm) in 10 feet (3.048 m) of surface plane in any direction.

B. Aggregate: To roofed area, apply aggregate ballast uniformly over geotextile fabric at rate required by manufacturer, but not less than the following, carefully spreading aggregate to not damage roofing membrane and base flashings. Apply ballast as insulation is installed, leaving roofing membrane insulated and ballasted at end of workday.

1. Ballast: [**15 lb/sq. ft. (75 kg/sq. m)**] [**20 lb/sq. ft. (100 kg/sq. m)**], aggregate within [**102 inches (2600 mm)**] of roof perimeter and corners and [**24 inches (600 mm)**] of roof penetrations; 10 lb/sq. ft. (50 kg/sq. m) aggregate elsewhere.

   a. Install two rows of walkway roof pavers in lieu of aggregate ballast at roof perimeter, corners, and penetrations[, unless otherwise indicated on Drawings].

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage membrane roofing and vegetated roof assembly Manufacturer's authorized technical service representative to provide full-time inspection of vegetated roof assembly installation and prepare interim and final inspection reports.

B. Correct identified deficiencies or irregularities in work that do not comply with requirements.

3.6 PLANT MAINTENANCE

A. General: During maintenance period prior to substantial completion[, and during warranty period], maintain plantings by pruning, cultivating, supplemental watering if required, weeding, fertilizing if required, removal of debris from drainage areas, adjusting and repairing devices, resetting plants to proper elevations or vertical position, and performing other operations as required to establish healthy, viable plantings.

B. Replace growing media that becomes displaced or eroded because of settling or other processes.

C. Maintain integrated pest management program to keep plant materials, planted areas, and growing media free of pests and pathogens or disease following recommendations of USEPA as appropriate to minimize the use of pesticides and reduce hazards.

D. Use only products and methods acceptable to membrane roofing Manufacturer.

3.7 CLEANING AND PROTECTION

A. During planting and maintenance, keep adjacent areas and construction clean and maintain work area in an orderly condition.

B. Protect vegetated roof assemblies from damage due to planting operations and operations of other contractors and trades. Repair or replace damaged vegetated roof assemblies.

END OF SECTION 32 95 00

APPENDIX F

CDS INSPECTION AND MAINTENANCE GUIDE

CONTECH®
ENGINEERED SOLUTIONS

CDS® Inspection and Maintenance Guide

CDS TECHNOLOGIES

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.5	0.4
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treament products. For information, visit www.ContechES.com or call 800.338.1122

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; 7,517,450 related foreign patents or other patents pending.

CONTECH ENGINEERED SOLUTIONS
800.925.5240
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CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

APPENDIX G

TEMPORARY EROSION AND SEDIMENT CONTROL INSPECTION & MAINTENANCE CHECKLIST/PERMANENT STORMWATER MANAGEMENT PRACTICE INSPECTION & MAINTENANCE CHECKLIST

JMC Project 15207
Washington Mews
Washington Avenue
Village of Hastings-on-Hudson, NY

Temporary Erosion and Sediment Control Inspection and Maintenance Checklist

Erosion and Sediment Control Measure	Inspection/Maintenance Intervals	Inspection/Maintenance Requirements
Stabilized Construction Entrance	Daily	• Periodic top dressing with additional aggregate as required • Clean sediment in public right-of-ways immediately
Silt Fence	Weekly + After Each Rain	• Remove & redistribute sediment when bulges develop in the silt fence.
Inlet Protection	Weekly + After Each Rain	• Refer to Figures A5.11, A5.12, A5.13 & A5.14 within the NYSDEC New York State Standard and Specifications for Erosion and Sediment Control

JMC Project 15207
Washington Mews
Washington Avenue
Village of Hastings-on-Hudson, NY

Permanent Stormwater Management Practice Inspection and Maintenance Checklist

Stormwater Management Practices	Inspection/Maintenance Intervals	Inspection/Maintenance Requirements
Drain Inlets	Monthly	• Check for blockage and/or erosion at top of each inlet. Repair/remove as necessary. • Check for sediment and debris collected within sumps and clean out as necessary.
CDS Water Quality Structure	Quarterly + After Major Storms (See Inspection and Maintenance Guide in Appendix F)	• Open access cover for visual inspection and measure the distance from the standing water surface to the sediment pile with a measuring stick or tape. If less than 4 feet, insert hose from vacuum truck into the sump and screen through both access covers to clean out the standing water, layer of oil, sediment, trash, etc. • The screen must be powerwashed to ensure it is free of trash and debris.
Green Roof	Spring	• Annual Soil Test by removing small soil quantities and sending to a testing laboratory for nutrient content, etc. • Begin biweekly weed inspection and removal. • Judiciously apply phosphorus free fertilizer if needed based on the annual soil test results. • Biweekly check for displaced soil, inspect roof drains, remove debris and check for pests.

JMC Project 15207
Washington Mews
Washington Avenue
Village of Hastings-on-Hudson, NY

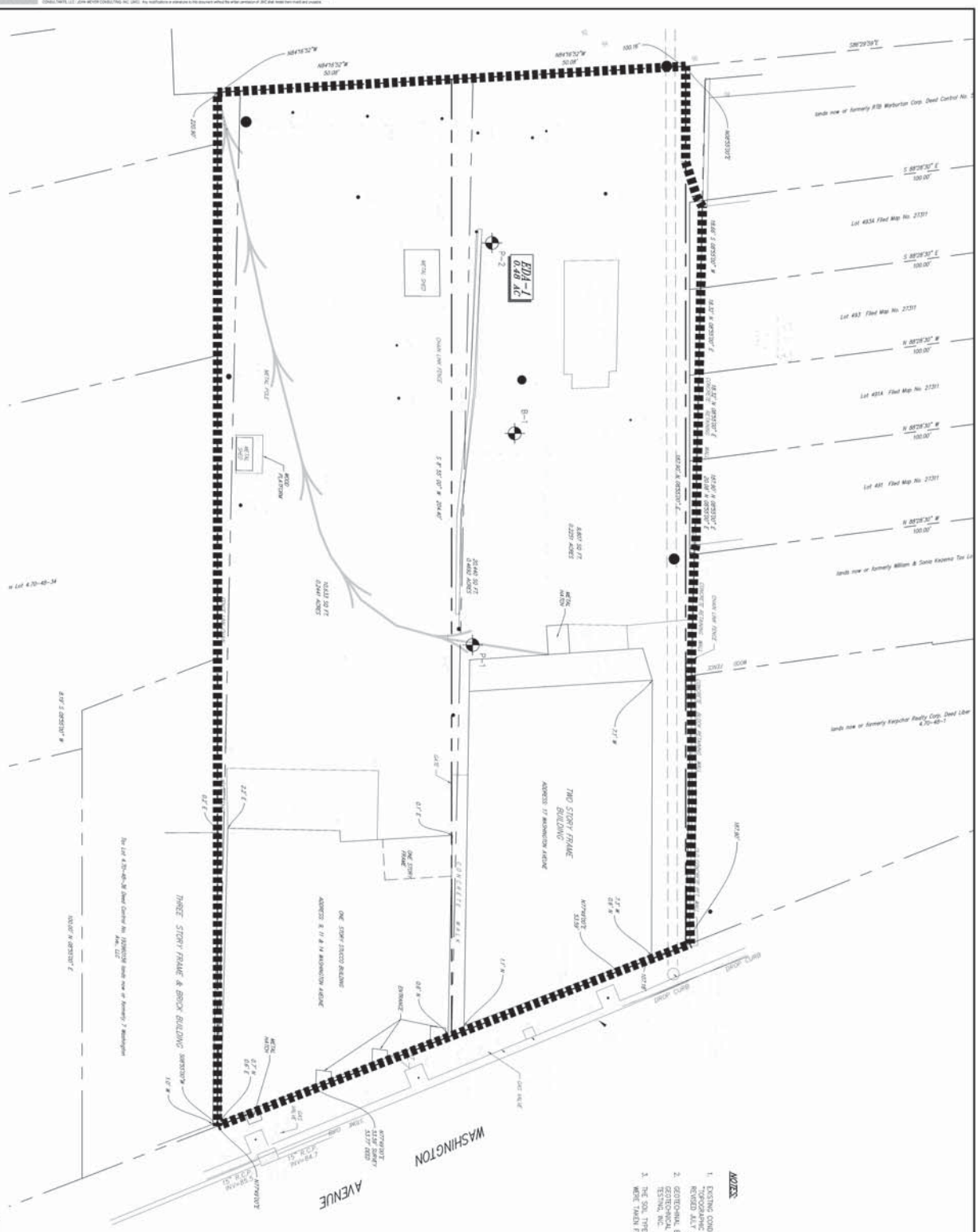
Permanent Stormwater Management Practice Inspection and Maintenance Checklist

Stormwater Management Practices	Inspection/Maintenance Intervals	Inspection/Maintenance Requirements
Green Roof	Summer	• Continue biweekly weed inspection and removal. • Continue biweekly inspection for soil displacement, roof drains, debris, pest control, etc. • Irrigation may be required every 2 or 3 weeks during prolonged hot, dry weather.
	Fall	• Continue biweekly weed inspection and removal. • Continue biweekly inspection for soil displacement, roof drains, debris, pest control, etc.
	Winter	• Remove snow as needed from access walkways.

APPENDIX H

DRAWINGS

NOT FOR CONSTRUCTION



NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN WERE TAKEN FROM SURVEY TITLED, "TOPOGRAPHIC SURVEY OF PROPERTY," PREPARED BY LAM LAND SURVEYORS PC, LAST REVISED JULY 28, 2014.
2. GEOTECHNICAL BORINGS/TEST PIT LOCATIONS DEPICTED ON THIS PLAN WERE TAKEN FROM THE GEOTECHNICAL REPORT TITLED "9 WASHINGTON AVENUE DATED 10/16/2015, PREPARED BY SOIL TESTING, INC.
3. THE SOIL TYPES, HYDROLOGIC SOIL GROUPS AND BOUNDARY INFORMATION SHOWN ON THIS PLAN WERE TAKEN FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, WEB SOIL SURVEY.

EXISTING DRAINAGE LEGEND

EXISTING GRADE
FLAGGED WETLANDS WITH FLAG NUMBERS
EXISTING STONE WALL
WATERSHED BOUNDARY LINE
LIMIT OF SOIL GROUPS LINE
FLOW PATH LINE

No.	Revision	Date	By
	Planning Board Submission	11/05/2015	JSJ

ANY ALTERATION OF PLANS, SPECIFICATIONS OR REPORTS BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW. IN ADDITION TO SECTION 7209, SUBSECTION 2

Drawn: JSJ
Date: 1" = 30'
Project No: 15027
Date: 11/05/2015
Approved: DL
Drawing No: DA-1

EXISTING DRAINAGE AREA MAP

WASHINGTON MEWS
9-17 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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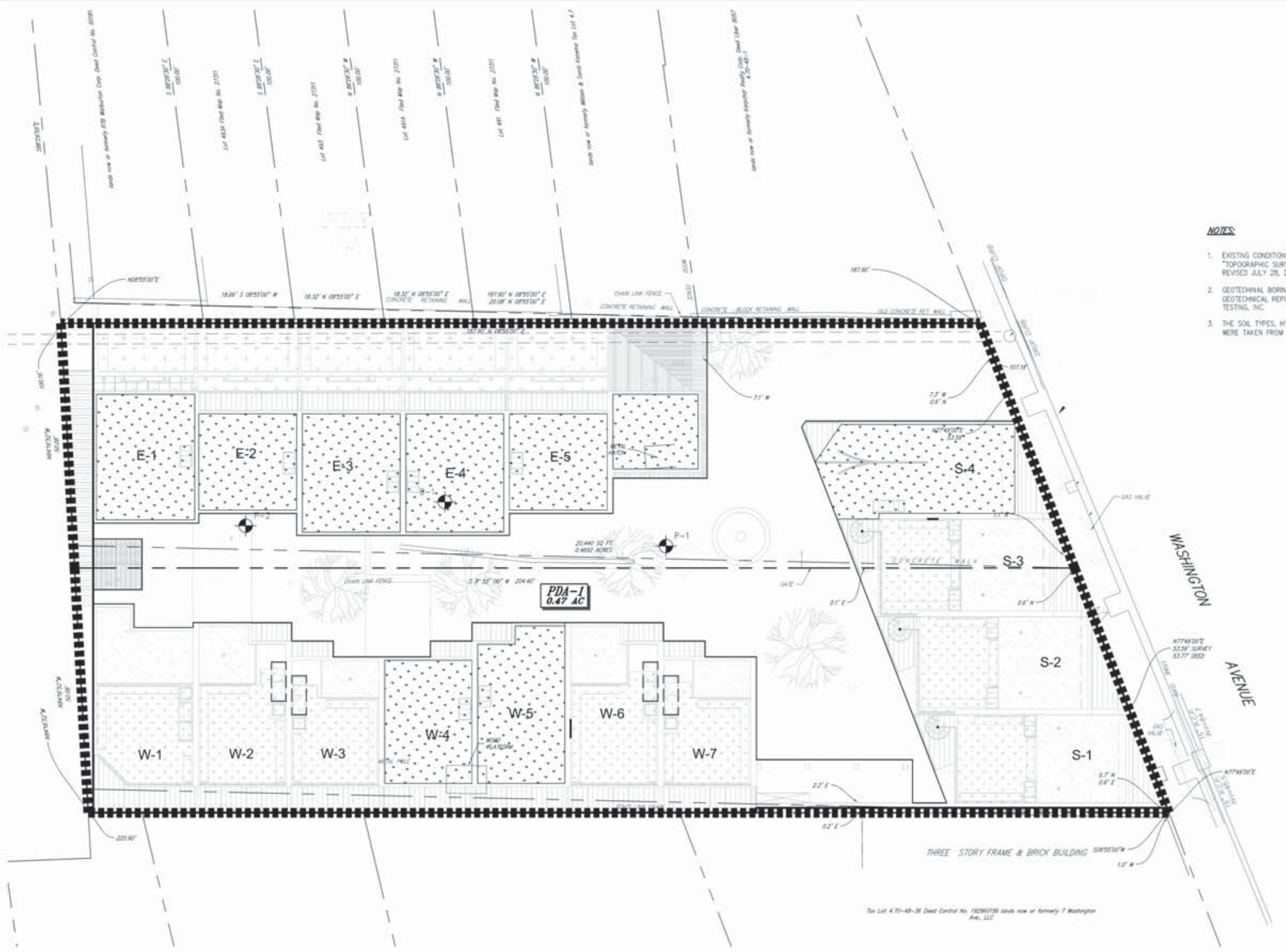
JMC Planning, Engineering, Landscape Architecture & Land Surveying, PLLC
JMC Site Development Consultants, LLC
John Meyer Consulting, Inc.
120 BEDFORD ROAD • ARMONK, NY 10504
voice 914.273.5225 • fax 914.273.2102

RTB WASHINGTON LLC
12 HIDDEN GLEN ROAD
SCARSDALE, NY 10583

BALDWIN & FRANKLIN ARCHITECTS
73 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706



PROPOSED DRAINAGE LEGEND

	EXISTING GRADE
	PROPOSED FINISHED GRADE
	FLAGGED WETLANDS WITH FLAG NUMBERS
	PROPOSED DITCH OR SWALE
	EXISTING STONE WALL
	WATERSHED BOUNDARY LINE
	LIMIT OF SOIL GROUPS LINE
	FLOW PATH LINE
	PROPOSED BUILDING LINE
	PROPOSED GREEN ROOF

NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM SURVEY TITLED, "TOPOGRAPHIC SURVEY OF PROPERTY," PREPARED BY LINK LAND SURVEYORS P.C., LAST REVISED JULY 28, 2014.
2. GEOTECHNICAL BORING/TEST PIT LOCATIONS DEPICTED ON THIS PLAN WERE TAKEN FROM THE GEOTECHNICAL REPORT TITLED, 17 WASHINGTON AVENUE DATED 10/16/2015, PREPARED BY SOIL TESTING, INC.
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JMC
SITE DEVELOPMENT CONSULTANTS
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PROPOSED DRAINAGE
AREA MAP

WASHINGTON MEWS
9-17 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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No.	Revision	Date	By

Previous Editions Obsolete

Drawn: JSJ Approved: DL
Scale: 1" = XX'
Date: 11/05/2015
Project No: 15207
Drawing No:
DA-2

NOT FOR CONSTRUCTION

Baldwin & Franklin, Architects
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Telephone (914) 693-5324
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E-Mail nedbaldwin@optonline.net

Memorandum

Date: **9 November 2015**

From: **Ned Baldwin**

To: **Charles Minozzi**

Re: **Washington Mews Project**

BUDDY:

Further to our meeting this morning we are writing to confirm the outcome of your review with Erika Krieger of the state code issues for this project. These as contained in our October submission to the Planning Board were as follows:

(1) Application of ADA to the Mews area with regard to the need for a Second Accessible exitway.
Provision of this is clearly impossible for this scheme. Our position is that ADA does not apply to this project at all excepting the Café. See ADA interpretation received from their regional office. We also consider the entire Mews area to be a "Public way" as defined in the Village and State Codes.

(2) Issue per 1024.3 which requires that Exit discharge points be more than 10' from a P.L. Our north exit stair from the Mews discharges more than 10' from the P.L. but
portions of the stair above that point are less than 10' from the P.L.
We can redesign this stair but feel that 1024.3 really relates to discharge points, not the stair itself, particularly if provided with appropriate fire separations.

(3) You are applying 704.2 to disallow our 5' deep balconies on our west units which extend to the P.L..
We believe this section applies to cantilevered balconies and roof overhangs , not to recessed spaces behind the building line.

(4) Variance required for substitution of 4' wide path and steps at the north exitway for 10' wide accessible "public way".
We have no accessible access to this exitway and no way to provide one.

(5) Confirm that we are allowed 25% unprotected openings 5'+ away from the West P.L. in our R-2 fully sprinkled building.

(1) The definition of Accessible Means of egress is such that our Mews opening to Washington Avenue constitutes two accessible ones on its own. The third to the North need not be accessible.

(2) Article 1024.3 does not apply to this project as the exit discharge is to adjacent public lands not private ones for which this provision is intended.

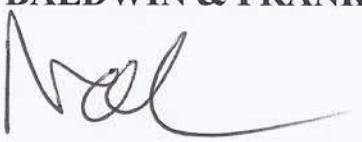
(3) Our interpretation of the west balconies as not constituting "projections" but rather outdoor space within the building structure, was accepted however it was noted that as such these spaces must be sprinkled.

(4) This variance is still required as the pathway proposed does not constitute a legal "public way". This is still to be confirmed.

(5) Table 704.8 limits unprotected openings to 25% of the wall area for exterior walls facing private property. In the worst case this amounts to 35.65 SF. While we had sought sliding doors at approximately 56 SF (39.27%)protected by fire rated, fusible link activated, rolling steel fire shutters which we thought also complied with table 404.8 we are now advised that we can combine operable doors (under 35.65SF) with 1 hour fire rated fixed glass to the full 56 SF and still comply. We have elected to do the latter and eliminate the shutters. A minor drawing revision will be required to keep the fixed glass units within the permitted maximum.

We have taken the liberty of adding this memo to the flash drive containing the SWPPP.

BALDWIN & FRANKLIN ARCHITECTS



NED

cc: Alex Cheng

Affordable units

Consideration

Affordable units are integral part of the development. Affordable units are to be representative of the makeup of the development.

Development

The mix of the development is as follows.
4 bedroom units: 2
3 bedroom units: 1
2 bedroom units: 8
1 bedroom units: 5
Total number of residential units is 16.

Calculation

16 x 15% = 2.4
Therefore 2 units are required. 1 1-BR unit and 1 2-BR unit are to be selected.

Designation

Tentatively, E5 and W6 are designated as affordable units

WASHINGTON MEWS PROJECT

To the Hastings on Hudson Planning Board for October 15, 2015:

We are resubmitting drawings 1-6, 10 and new drawings 15 and 16. There are no revisions to 1 and 2 but these are included for completeness. Drawings 3,4,5,&6 are reissued to show our new roof access provisions to replace the spiral stairs at the West houses, Dwg 10 has been revised to up date open space and parking totals, new drawing 15 illustrates all open space provisions, and new drawing 16 illustrates the location of test wells and building height flags on the existing site.

Current variances required are as follows:

COVERAGE:

Relief from Article 295-18 and 295-72-2 E-4 restricting coverage to 80% in this MRC district to allow coverage of 87.8% on this site.

Applicant's argument:

Site coverage as defined in 295-5 does not refer to subgrade structures. Structure as also defined in 295-5 refers only to structures above grade. If the Mews area is considered open space which it is, then the project complies.

PARKING:

Relief from the strict application of 295-36A to permit the provision of 25 spaces in lieu of the 29 required. (See #6 below re possible increase in variance required)

Relief from 295-29B requiring that maneuvering aisles be 25' to permit a 24' standard width in this instance.

Applicant's argument:

2 spaces are required only due to the existence of a small administrative/maintenance office within the common area of the project . This will be used for very short periods of time. 25 spaces is adequate for 16 dwelling units. 24' maneuvering aisles are nationally accepted and meet New York State and New York City requirements.

YARD REQUIREMENTS:

Relief from the application of 295-72.2(e)1 and 295-20G interpreted by the Building Dept to require a 27' setback on the west side of the site and 25' on the east.

Applicant's argument:

No set back is required as the abutting MR-C district is not a residential district as defined under 295-5.

Of the 22 properties that comprise the MR-C district none comply with this interpretation and only 3 have any side yard setbacks at all.

<u>USE OF VILLAGE LANDS</u>:

The board is requested to recommend to the ZBA and B of T that an easement be granted to permit development of a pedestrian path and steps across village lands north of the site to provide a means of egress for, and a public pedestrian route through, the project.

It is understood that this agreement will provide for reciprocal access by the public to the pedestrian mews area of the project.

<u>OTHER ISSUES RAISED IN PRIOR MEETINGS OF THE BOARD</u>:

(1) New York State Code review of the project

This has been carried out by Mr. Minozzi and meetings have been held to discuss all issues raised. The following items are being forwarded to Erika Krieger at the Dept of State for resolution or identification of any variance required:

(1) Application of ADA to the Mews area with regard to the need for a Second Accessible exitway.
Provision of this is clearly impossible for this scheme. Our position is that ADA does not apply to this project at all excepting the Café. See ADA interpretation received from their regional office. We also consider the entire Mews area to be a "Public way" as defined in the Village and State Codes.

(2) Issue per 1024.3 which requires that Exit discharge points be more than 10' from a P.L. Our north exit stair from the Mews discharges more than 10' from the P.L. but
portions of the stair above that point are less than 10' from the P.L.
We can redesign this stair but feel that 1024.3 really relates to discharge points, not the stair itself, particularly if provided with appropriate fire separations.

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We believe this section applies to cantilevered balconies and roof overhangs , not to recessed spaces behind the building line.

(4) Variance required for substitution of 4' wide path and steps at the north exitway for 10' wide accessible "public way".
We have no accessible access to this exitway and no way to provide one.

(5) Confirm that we are allowed 25% unprotected openings 5'+ away from the West P.L. in our R-2 fully sprinkled building.

We have attached copies of emails received from the ADA Regional Office which clarify its application to this project.

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(2) View Preservation

Three flags indicating the heights and extreme lengths of the fronts of the West Houses as currently drawn have been maintained on site.

(3) Storm water treatment system

A meeting was held with Frank Annunziata of James J. Hahn Engineering PC by the undersigned and our Civil Engineering consultant, Larry Nardecchia. It was agreed that two deep well percolation tests would be carried out on site at a depth of 17' below the existing grade. In addition it was agreed that a single observation well should be installed to the foundation bearing depth of 21' below the existing grade. This would provide us with reassurance that non cohesive soils were present., these being unlikely to have their bearing capacity affected by water saturation, and that no hard rock or high water table exists at the site. Obviously if rock is encountered a more extensive investigation would be required. Any rock excavation, should it be required, would be carried out by a chipping process, not by blasting. See item (7) below for more on excavation process. At this meeting the location of all three wells was agreed.

A contract for this work has been awarded to Soil Testing Inc. of Oxford CT.

We hope to have preliminary results by the time of your meeting.

(4) Open Space Provisions

One member of the board asked that we better illustrate the open space provisions of the project rather than the simple numerical tabulation shown on Drawing 10. We have added drawing Number 15 which attempts to do this.

(5) We have added drawing Number 16 which locates the building facades, height flags and subsurface investigation wells in plan atop the site existing condition survey.

(6) Accessible Parking Space

Mr. Minozzi has indicated that he expects that at least one van accessible parking space will be provided in the project regardless of ADA specifications as it is required by the NY State Code. We have not altered Dwg 1 to show this space as he is considering two alternative solutions either one of which is entirely acceptable to us. These are:

(a) Making space #25 the accessible space and leaving the column in the access aisle as is permitted in the State Code. This solution allows for a 20' long access aisle with no difficulty should that ultimately be mandated, but it does place the accessible space some 56' from the elevator.

(b) Making space #4 the van accessible space and #5 the access aisle thereby reducing our total parking count from 25 to 24 spaces and increasing our parking variance requirement to 5 spaces from 4. Space 4 is 24' from the elevator and is the nearest available space.

We will revise our drawing accordingly when a decision is made on this matter.

(7) SWPPP

The Hahn Engineering review dated August 17th outlines the requirements for the Storm Water Pollution Prevention Plan (SWPPP) which is required for the project. We respectfully request that submission of the SWPPP be made a requirement for issuance of a Building Permit, and not for referral of the project to the ZBA and BofT by the Planning Board. We feel that if we complete the Site Investigation we are undertaking now and obtain satisfactory results (normal perc rates, no cohesive soils, no solid rock, low water table) and that if Hahn Engineering confirm these results, then our client should be spared the expense of completing the full SWPPP until Site Plan approval of the overall project is in hand.

Several ancillary aspects of the SWPPP were mentioned in the Hahn review and by members of the public at the last meeting:

Possible overloading of existing storm sewers already receiving additional water from the Warburton bridge project.

Existing catch basins at the NE, SE, and NW corners of the Warburton and Washington intersection have been deemed adequate to accommodate the extra bridge run off. That at the NE and SE corners now serve a far larger watershed than any of the others. The downstream catch basin in this same system at the SW corner of our site is ideally placed to receive long term pump out of stored water *after* a storm from our site but we emphasize that this is not necessarily to form part of our long term disposal system design.

Nonetheless it offers a "last resort" means for disposing of storm water. Few areas in Hastings are served by storm sewers of any kind. We have reviewed this strategy with Mr. Gunther and he sees absolutely no problem with it. He states that the present system is entirely capable of handling heavy storms indefinitely. The only problem he has is that water coming down the Washington Avenue hill which has no such system during a storm often overshoots Warburton Ave catch basins on its East side.

Cut and Fill analysis of our excavation and means for removal of excess material.

Our excavation will involve the removal of approximately 6750 Cubic Yards of material from the site and the introduction of about 1900 CY of specialized backfill including washed crush stone, sharp concrete sand, and organic topsoil for garden areas. This amounts to about 340 truckloads out over a 3 to 4 week period and as much as 95 truckloads in over a far longer period as work progresses.

Excavation will be by conventional equipment with trucks utilizing Washington Ave. Approximately 150' of temporary steel sheet piling will be required along the east side of the building area to a depth of 20'. This will be driven in a time period of 3 to 4 days before general excavation commences.

Supporting document: Two emails received from the ADA regional Office

Good Morning Mr. Baldwin:

I am writing in response to your question below.

The ADA does not typically apply to multi-family residential housing, unless there is a some sort of funding involved in the project from state/local government funds. If this is a privately funded development, the ADA does not apply, to the units, but would apply to any areas open to the public (i.e. a leasing or sales office, etc…).

Having said that, the federal law that is typically applied to multi-family housing is the Fair Housing Act (FHA) – which applies to newly constructed multi-family housing where there are four or more units attached in a structure. There is an exception in the Fair Housing Act design guidelines however for multi-story units (they are not required to comply with FHA). So if all of the units in your project are multi-story units (finished living space on one floor and the floor immediately above/below) then they are exempt from FHA. If you have single story units in the project, those would likely have to meet FHA.

Given all of this, the applicable code that I see for your project would be the 2010 Building Code of NYS (assuming your project is located in NYS). The NYS Building Code contains the following exception in Chapter 11 – Section 1107 for R-2 occupancies:

1107.7.2 Multistory units. A multistory dwelling or sleeping unit which is not provided with elevator service is not required to be a Type B unit. Where a multistory unit is provided with external elevator service to only one floor, the floor provided with elevator service shall be the primary entry to the unit, shall comply with the requirements for a Type B unit and a toilet facility shall be provided on that floor.

RE: the parking, it is advisable to provide at least one accessible parking space in the garage that meets the requirements of the NYS building code, so the space should be at least 8 feet wide with an adjacent minimum 8 feet wide access aisle.

Thank you for contacting the Northeast ADA Center.

Best Regards,

Jennifer Perry

Hello Ned:

If you look at ICC ANSI A117.1 Section 502.4.3 as I indicated below, you will see that ANSI requires the access aisle for the space (either van or car accessible) to be as long as the space it serves. The 20' length you are referring to is for a passenger loading zone, not an accessible parking space or access aisle. I think you are misunderstanding these two items. A passenger loading zone is not the same thing as an access aisle. The correct code requirement for the van accessible parking space and access aisle is ICC ANSI A117.1 Section 502. Section 503 is for passenger loading zones, not accessible parking spaces or aisles.

Yes, you are required to have one van accessible parking space if you have 25 parking spaces in the lot.

I hope this clarifies the requirement for you.

Thank you-

Best Regards,

Jennifer Perry
Access Specialist
ILR School, Cornell University
800.949.4232
Direct: 732.449.3621

K.Lisa Yang and Hock E. Tan
Employment and Disability Institute
jlp359@cornell.edu
www.northeastada.org

(8) We are aware that the board must approve the designation of affordable units. This proposed designation will be agreed between Mr. Cheng and the Affordable Housing Committee and provided to you for approval at the next meeting after October 15th.

BALDWIN & FRANKLIN ARCHITECTS

Edward R. Baldwin
cc: Alex Cheng

LIST OF DRAWINGS:

***:** ISSUED IN THIS SET FOR 15 OCTOBER 2015 PB MEETING

OWNERS
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Scarsdale, N.Y. 10583
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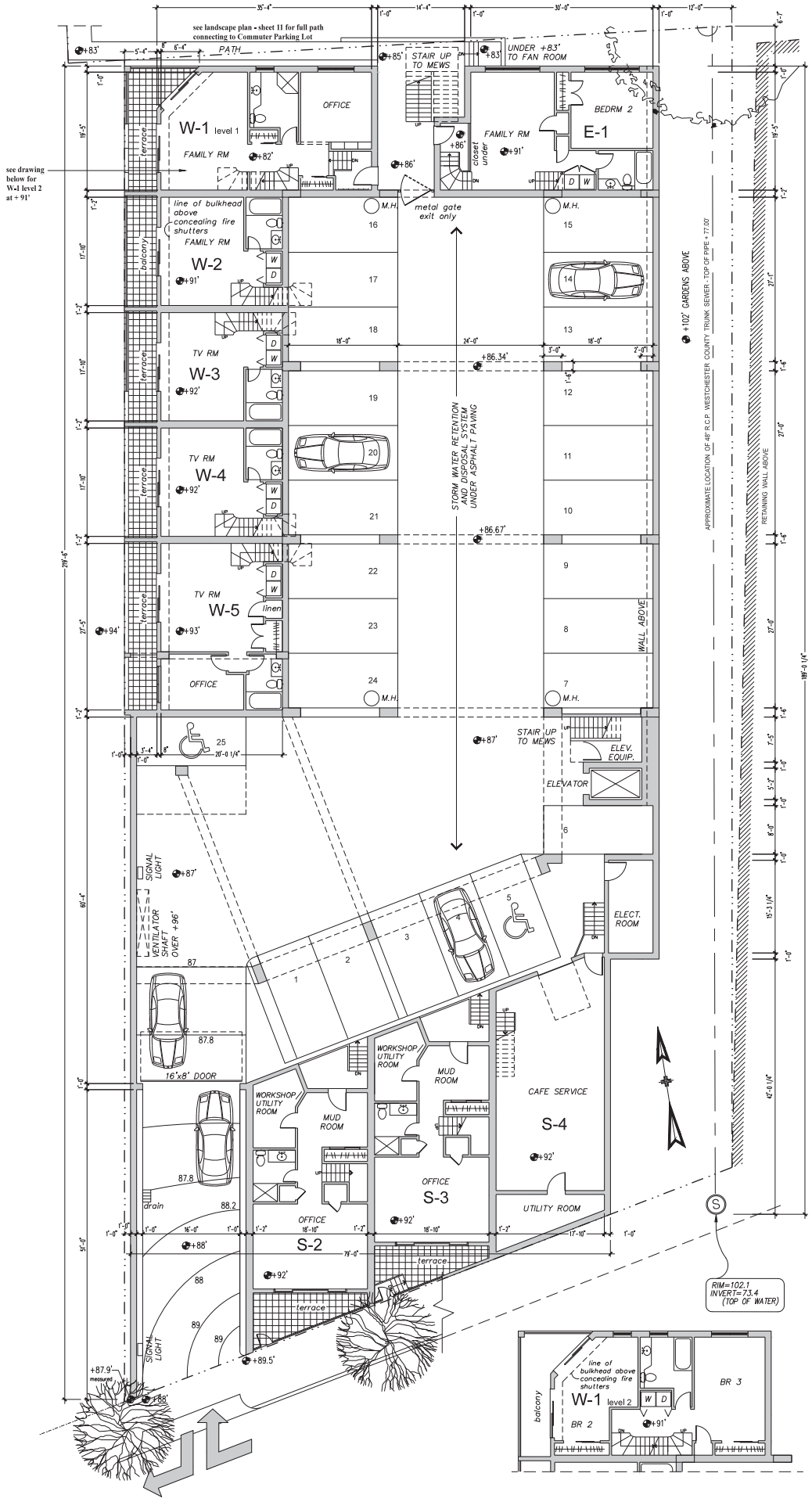
CONSULTANTS
- Tomasz LOPINSKI, CAD & 3D Modeling
- NCK Engineering, Structural
- Larry J. NARDECCHIA Jr., P.E., Civil Engineering

WASHINGTON MEWS

A MID-BLOCK INFILL MEWS HOUSING DEVELOPMENT

SECTION 4.70 - BLOCK 48 - LOTS 37 & 38

ISSUE DATE: 1 OCTOBER 2015



Baldwin & Franklin Architects
73 Washington Avenue
Hastings-on-Hudson, N.Y. 10706
Tel.: (914) 693 5324 Fax: (914) 693 5676

Project:

WASHINGTON MEWS
RTB WASHINGTON LLC

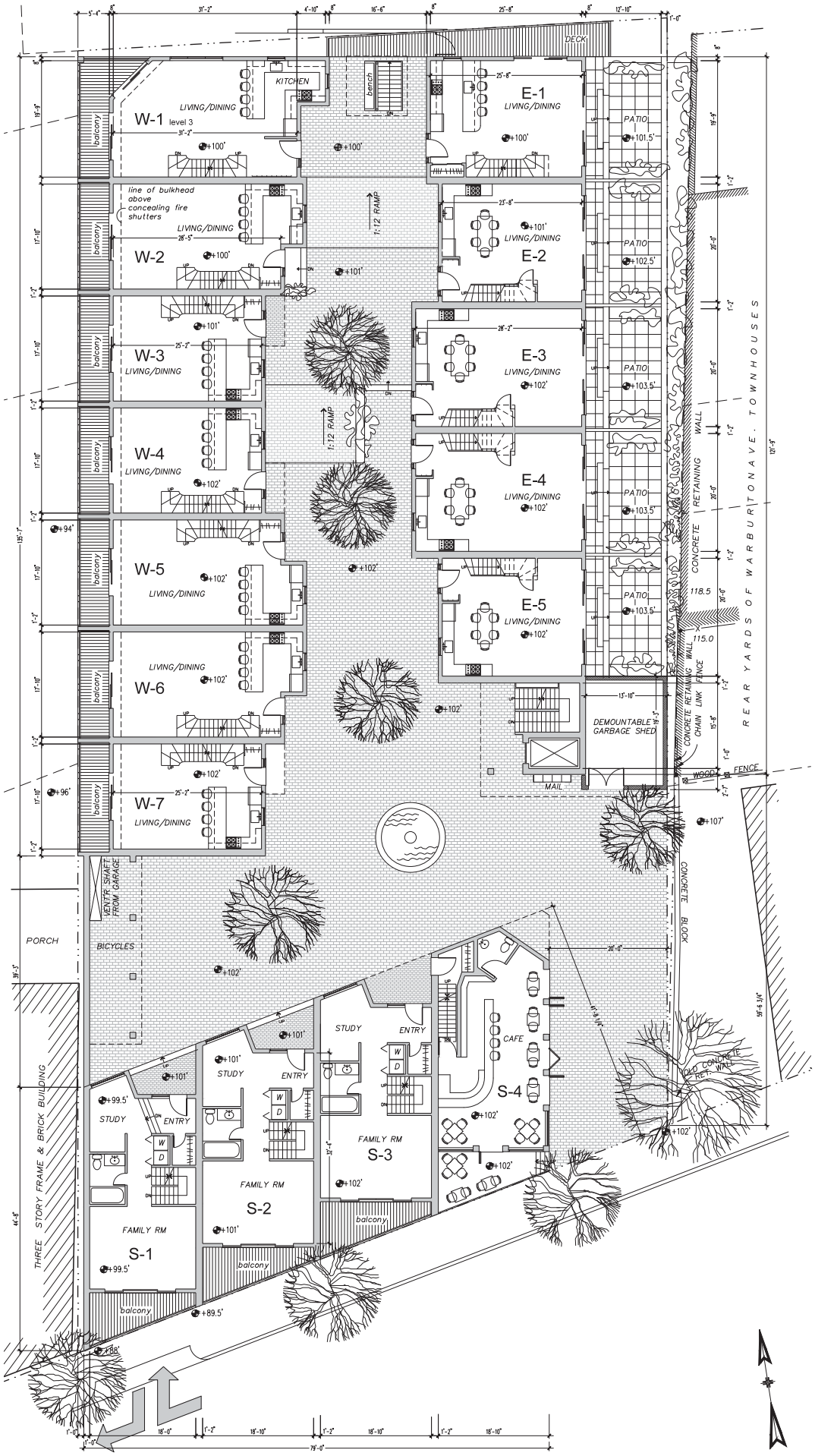
Sheet Title:

Parking Floor Plan

Project No.: 1405
Date: Aug 6th, 2015
Scale: 1/8" = 1-0'
Drawn: GA

Sheet No.:

1



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Tel.: (914) 693 5324 Fax: (914) 693 5676

Project:

WASHINGTON MEWS
RTB WASHINGTON LLC

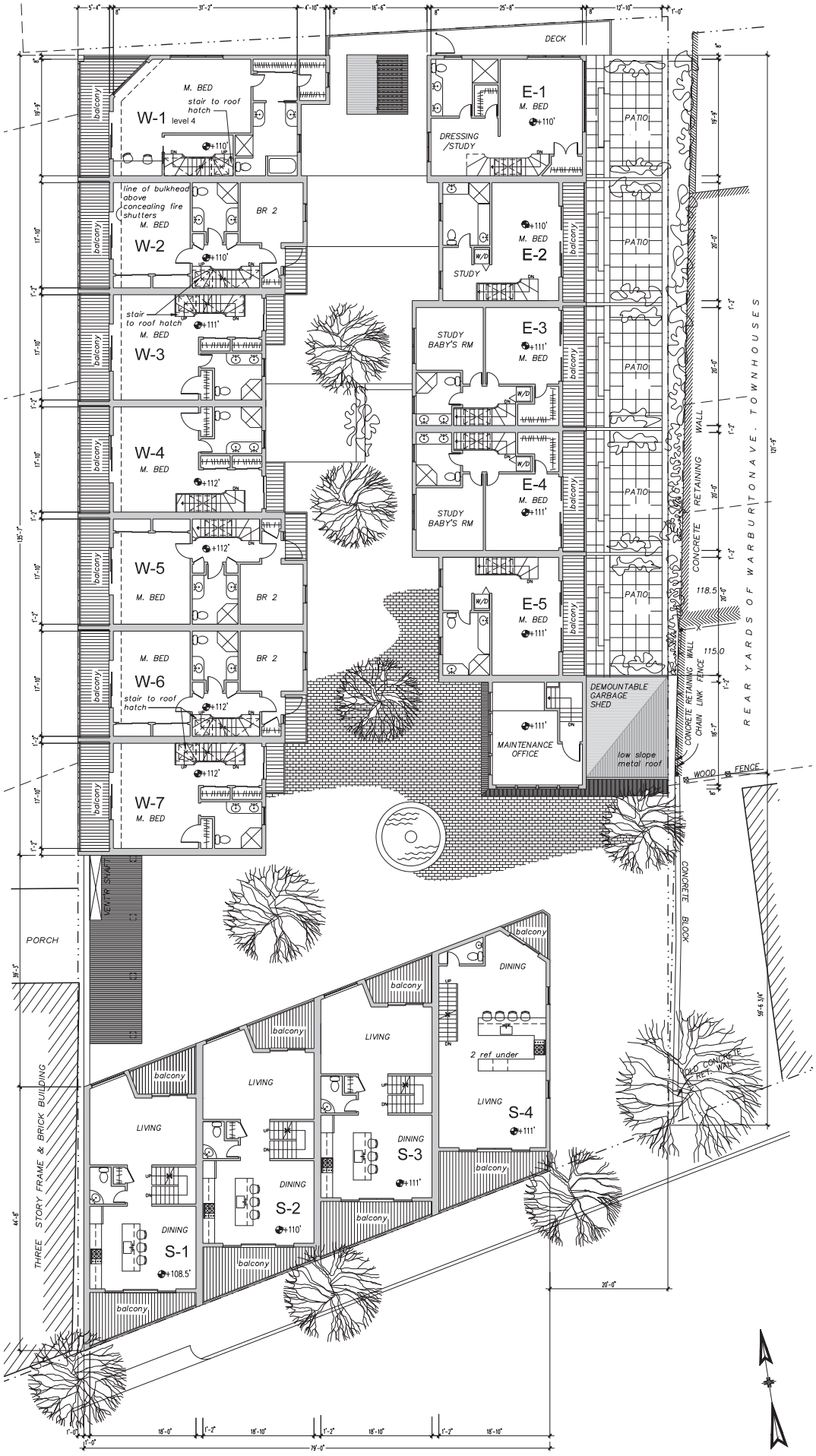
Sheet Title:

Mews Level Plan (First Floor)

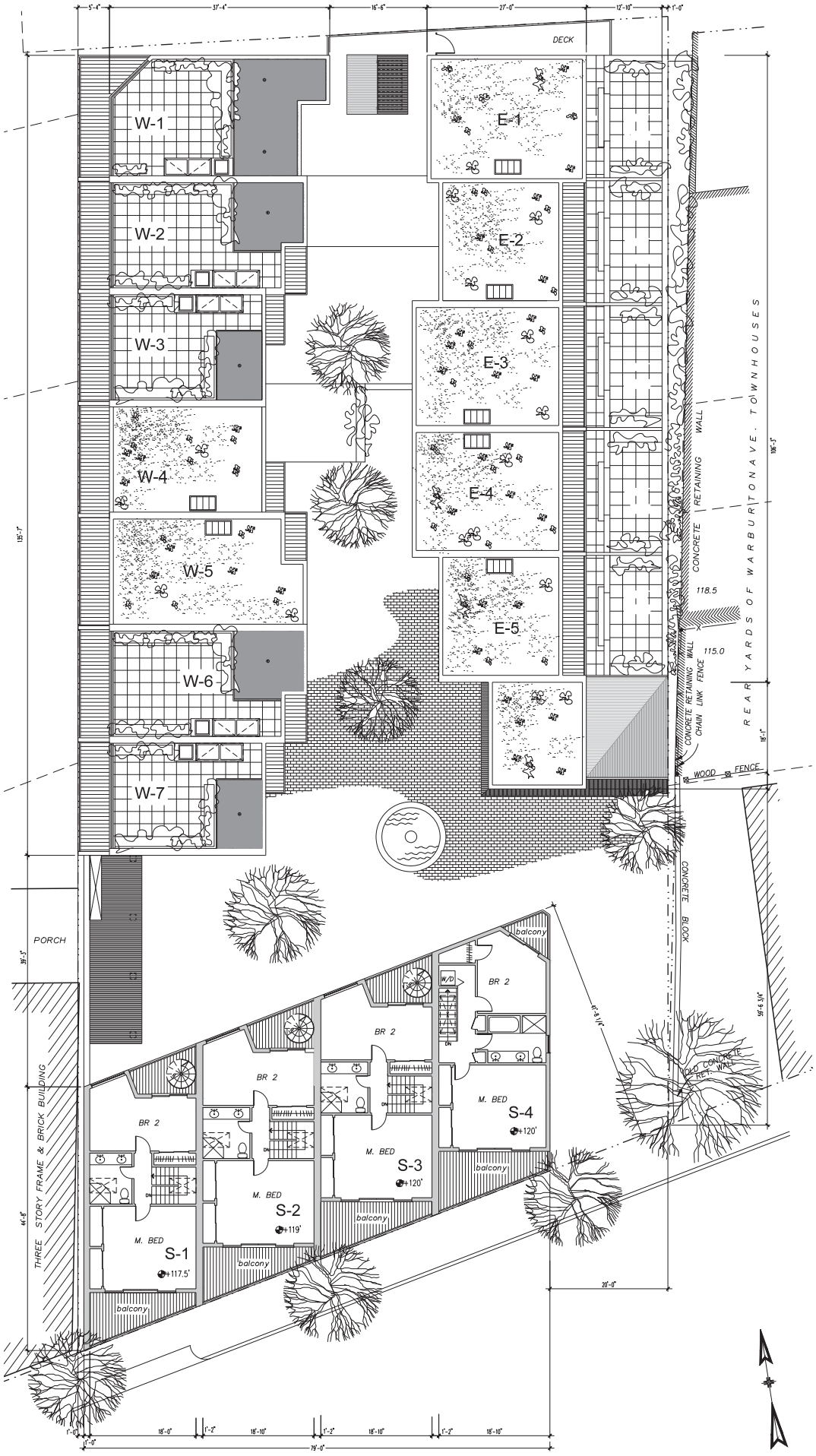
Project No.: 1405	
Date: Aug 6th, 2015	
Scale: 1/8" = 1-0'	
Drawn: GA	

Sheet No.:

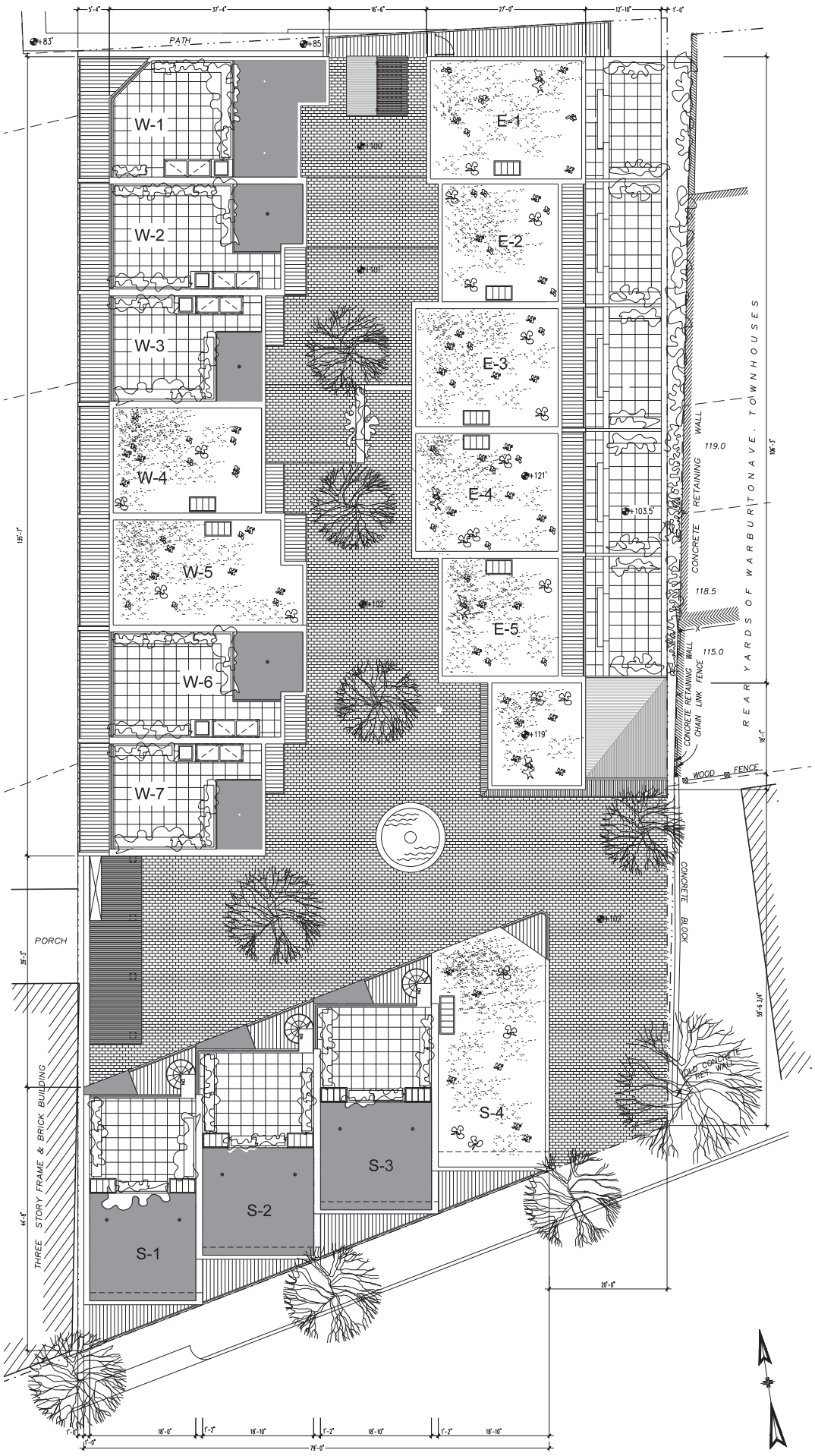
2



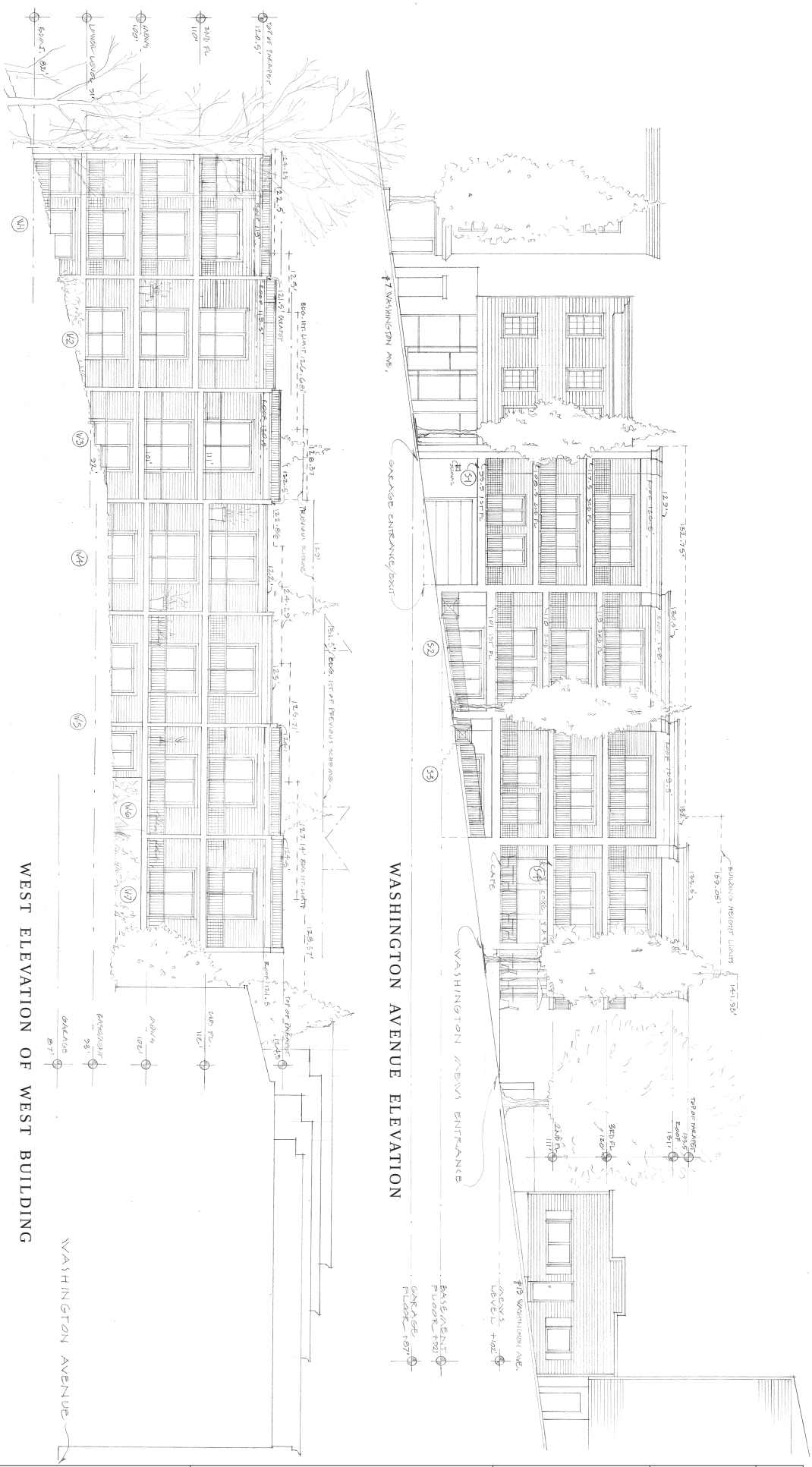
Baldwin & Franklin Architects 73 Washington Avenue Hastings-on-Hudson, N.Y. 10706 Tel.: (914) 693 5324 Fax: (914) 693 5676	Project: **WASHINGTON MEWS** **RTB WASHINGTON LLC**	Sheet Title: **Second Floor Plan**	Project No.: 1405 Date: Oct 1st, 2015 Scale: 1/8" = 1-0' Drawn: GA	Sheet No.: **3**



Baldwin & Franklin Architects 73 Washington Avenue Hastings-on-Hudson, N.Y. 10706 Tel.: (914) 693 5324 Fax: (914) 693 5676	Project: **WASHINGTON MEWS** **RTB WASHINGTON LLC**	Sheet Title: **Third Floor Plan**	Project No.: 1405 Date: Oct 1st, 2015 Scale: 1/8" = 1-0' Drawn: GA	Sheet No.: **4**



Baldwin & Franklin Architects 73 Washington Avenue Hastings-on-Hudson, N.Y. 10706 Tel.: (914) 693 5324 Fax: (914) 693 5676	Project: **WASHINGTON MEWS** **RTB WASHINGTON LLC**	Sheet Title: **Roof Plan**	Project No.: 1405 Date: Oct 1st, 2015 Scale: 1/8" = 1-0' Drawn: GA	Sheet No.: **5**



Baldwin & Franklin Architects 73 Washington Avenue Hastings-on-Hudson, N.Y. 10706 Tel.: (914) 693 5324 Fax: (914) 693 5676	Project: **WASHINGTON MEWS** **RTB WASHINGTON LLC**	Sheet Title: **Washington Avenue South & West Elevations**	Project No.: 1405 Date: 1 OCTOBER 2015 Scale: 1/8"= 1'-0" Drawn: GA	Sheet No.: **6**

TABULATION OF SPACES BY USE

UNIT	USE (Residential Commercial, Office, Garage)	LEVEL	NET F.A.	BR's	OPEN SPACE REQUIRED	OPEN SPACE PROVIDED	ROOF GARDEN	OFF STREET PARKING SPACES REQUIRED
E-1	R	MEWS	507 S.F.	0	-	396 S.F.	NO	1.75
		LOWER	608 S.F.	1	100 S.F.	-		
		2nd FL.	507 S.F.	1	100 S.F.	-		
		TOTAL	1622 S.F.	2	200 S.F.	396 S.F.		
E-2	R	MEWS	470 S.F.	0	-	257 S.F.	NO	1.5
		2nd FL.	390 S.F.	1	100 S.F.	80		
		TOTAL	860 S.F.	1	100 S.F.	337 S.F.		
E-3	R	MEWS	560 S.F.	0	-	257 S.F.	NO	1.75
		2nd FL.	480 S.F.	2	200 S.F.	80		
		TOTAL	1040 S.F.	2	200 S.F.	337 S.F.		
E-4	R	MEWS	560 S.F.	0	-	257 S.F.	NO	1.75
		2nd FL.	480 S.F.	2	200 S.F.	80		
		TOTAL	1040 S.F.	2	200 S.F.	337 S.F.		
E-5	R	MEWS	470 S.F.	0	-	257 S.F.	NO	1.5
		2nd FL.	390 S.F.	1	100 S.F.	80		
		TOTAL	860 S.F.	1	100 S.F.	337 S.F.		
W-1	R	MEWS	616 S.F.	0	-	124 S.F.	YES	2.0
		2nd FL.	616 S.F.	1	100 S.F.	124 S.F.		
		LOWER	655 S.F.	2	200 S.F.	124 S.F.		
		LOWEST	655 S.F.	0	100 S.F.	124 S.F.		
		TOTAL	2542 S.F.	3	400 S.F.	496 S.F.		
W-2	R	MEWS	540 S.F.	0	-	89 S.F.	YES	1.75
		2nd FL.	540 S.F.	2	200 S.F.	89 S.F.		
		LOWER	357 S.F.	0	-	89 S.F.		
		TOTAL	1437 S.F.	2	200 S.F.	267 S.F.		
W-3	R	MEWS	449 S.F.	0	-	89 S.F.	YES	1.5
		2nd FL.	449 S.F.	1	100 S.F.	89 S.F.		
		LOWER	357 S.F.	0	-	89 S.F.		
		TOTAL	1255 S.F.	1	100 S.F.	267 S.F.		
W-4	R	MEWS	449 S.F.	0	-	89 S.F.	YES	1.5
		2nd FL.	449 S.F.	1	100 S.F.	89 S.F.		
		LOWER	357 S.F.	0	-	89 S.F.		
		TOTAL	1255 S.F.	1	100 S.F.	267 S.F.		
W-5	R	MEWS	540 S.F.	0	-	89 S.F.	NO	1.5
		2nd FL.	540 S.F.	2	200 S.F.	89 S.F.		
		LOWER	548 S.F.	0	-	89 S.F.		
		TOTAL	1628 S.F.	2	200 S.F.	267 S.F.		
W-6	R	MEWS	540 S.F.	0	-	89 S.F.	YES	1.75
		2nd FL.	540 S.F.	2	200 S.F.	89 S.F.		
		TOTAL	1080 S.F.	2	200 S.F.	178 S.F. + ROOF		
W-7	R	MEWS	449 S.F.	0	-	89 S.F.	YES	1.5
		2nd FL.	449 S.F.	1	200 S.F.	89 S.F.		
		TOTAL	898 S.F.	1	200 S.F.	178 S.F. + ROOF		
S-1	R	MEWS	559 S.F.	0	-	99 S.F.	YES	1.75
		2nd FL.	559 S.F.	0	-	163 S.F.		
		3rd FL.	559 S.F.	2	200 S.F.	163 S.F.		
		TOTAL	1797 S.F.	2	200 S.F.	425 S.F.		
S-2	R	MEWS	625 S.F.	2	200 S.F.	127 S.F.	YES	2.0
		LOWER	625 S.F.	0	-	127 S.F.		
		2nd FL.	625 S.F.	0	-	191 S.F.		
		3rd FL.	625 S.F.	2	200 S.F.	191 S.F.		
		TOTAL	2500 S.F.	4	400 S.F.	636 S.F.		
S-3	R	MEWS	625 S.F.	2	200 S.F.	127 S.F.	YES	2.0
		LOWER	625 S.F.	0	-	127 S.F.		
		2nd FL.	625 S.F.	0	-	191 S.F.		
		3rd FL.	625 S.F.	2	200 S.F.	191 S.F.		
		TOTAL	2500 S.F.	4	400 S.F.	636 S.F.		
S-4	R	MEWS	54 S.F.	0	-	-	NO	1.75
		2nd FL.	640 S.F.	0	-	164 S.F.		
		3rd FL.	640 S.F.	2	200 S.F.	164 S.F.		
		TOTAL	1314 S.F.	2	200 S.F.	328 S.F.		
CAFE	C	MEWS	654 S.F.	0	-	127 S.F.	NO	0
		LOWER	758 S.F.	0	-	0 S.F.		
		TOTAL	1412 S.F.	0	-			
OFFICE (Common Area Maintenance Office)	O	2nd FL.	231 S.F.	0	NONE	NONE	NO	2
GARAGE	G	LOWER	9082 S.F.	0	NONE	NONE	NO	0
GRAND TOTALS			34,353 S.F.		3200 S.F.	6075 S.F.		29 1/4 SPACES

NOTE: Under the NYS building code, all R uses are R-2 occupancies, the office is B occupancy and the garage (enclosed) is S-2 occupancy.

ZONING ANALYSIS MR-C DISTRICT LOTS 37 & 38, SECTION 4.70, BLOCK 48

DISCUSSION POINTS	ITEM	REQUIRED	EXISTING	PROPOSED	REQUIRED VARIANCES
COVERAGE CALCULATIONS **(SEE DRAWING SHOWING COVERAGE ON SHEET 9)** Total project coverage exceeds the 80% permitted by 295-72-2 e (4) only because the Hastings Building Dept has deemed the portion of the Mews over the subgrade garage to constitute building coverage. The basis for this interpretation is that the garage constitutes a structure and that structures constitute coverage. We have reviewed the definition of structure in 295-5 and very clearly it refers only to items placed above grade. The Mews is located at a grade very close to that now existing. We do not believe it should be considered as building coverage. If the Mews area was replaced by pervious pavement at 50 % total development coverage would be 13.1% less or 78.5%. Despite this interpretation the excess coverage is only 6.4% or 11.6% if the portion of the mews on natural grade is also included.	LOT AREA	2500 SF	20,440 SF/ 0.4692 acres	20,440 SF	
	MINIMUM AREA PER DWELLING UNIT	500 SF	N.A.	1278 SF	
	BUILDING COVERAGE ABOVE GRADE	N.A.	5296 SF or 25.9%	12,293 SF or 60.1%	
	TOTAL COVERAGE BY ALL 'STRUCTURES'	80% MAX 16,352 SF	5596 SF or 27.3%	17,944 SF or 87.8%	Relief from 295-72-2 E 4 87.8% in lieu of 80%
	TOTAL PERVIOUS PAVING COVERAGE		952 SF or 4.6%	1053.11 SF or 5.2%	
	TOTAL DEVELOPMENT COVERAGE	NOT STIPULATED	APPROX.. 57.89%	91.6%	MAXIMUM IS NOT STIPULATED. 295-72-2 E 4 DOES NOT MENTION PERVIOUS PAVEMENT
OPEN SPACE Required open space 295-72.2 a (2) Except for five east units which have 13'-9"deep gardens at grade, all units will have open space created within the footprint of the unit by a combination of balconies and roof terraces. The Hastings Building Department has deemed that the mews is not a 'court' as defined in 295-5 and therefore that 295-21 C does not apply to this project.	OPEN SPACE BY UNIT Per 295-72.2.A(2), requirement is: - 100 SF for each studio or 1 bedroom unit + 100 SF added for each additional bedroom. Resultant required areas are shown in the next columns. Provided space exceeds requirements in all cases.	E-1 200 SF W-5 200 SF E-2 100 SF W-6 200 SF E-3 200 SF W-7 200 SF E-4 200 SF S-1 200 SF E-5 100 SF S-2 400 SF W-1 400 SF S-3 400 SF W-2 200 SF S-4 200 SF W-3 100 SF CAFE none W-4 100 SF	N.A.	E-1 396 SF W-5 267 SF E-2 337 SF W-6 458 SF E-3 337 SF W-7 430 SF E-4 337 SF S-1 425 SF E-5 337 SF S-2 636 SF W-1 496 SF S-3 636 SF W-2 267 SF S-4 328 SF W-3 267 SF CAFE 127 SF W-4 267 SF	NONE
OFF STREET PARKING REQUIREMENTS The new curb cut will be 22' in width less than the 24' allowed. The existing 12' curb cut will be removed. The entry will be restricted to right turn in & right turn out. The ramp connecting the sidewalk within the garage will permit 2 way traffic. However by means of signal lights we will avoid this. One vehicle may wait off the street not obstructing traffic while the entry door is in operation. Cars exiting the garage will be aware of such a vehicle and be able to wait until the ramp is clear. Ramp grade is well within the 5% maximum stipulated in 295-31.	Per 295-36 A, required parking per unit is: - 1 1/4 spaces for studio - 1 1/2 spaces for 1 bedroom - 1 3/4 spaces for 2 bedrooms - 2 spaces for 3 bedrooms Per 295-36 E, CAFE is exempt OFFICE requires 2 spaces TOTAL REQUIRED: 29 1/4	E-1 1 3/4 W-5 1 1/2 E-2 1 1/2 W-6 1 3/4 E-3 1 3/4 W-7 1 1/2 E-4 1 3/4 S-1 1 3/4 E-5 1 1/2 S-2 2 W-1 2 S-3 2 W-2 1 3/4 S-4 1 3/4 W-3 1 1/2 CAFE 0 W-4 1 1/2 OFFICE 2 TOTAL: 29 1/4 spaces	N.A.	TOTAL: 25 spaces	RELIEF FROM 295-36A TO ALLOW THE PROVISION OF 25 SPACES IN LIEU OF 29 1/4
YARD REQUIREMENTS When this project was first reviewed by Mr. Sharma in August of 2007 all yard requirements were deemed to be zero and were so shown on the schedule in the code. Mr. Minozzi advised us on May 29th that all side yards in this district are required to be 10' as all properties abut lands in the same MR-C district and that the MR-C district is to be considered a residential district. In addition he stated that additional set backs after the first 50' @ 1' per 10' as required by 295-20 G would be added to the 10' yard. This results in a 27' side yard at the west side of the site and 25' on the east side. Up until this time we thought 295-72.2 e (1) referred to residential only R districts and also that 295-20 G could not be added to a zero setback. Of the 22 properties that comprise the MR-C district none are in compliance with this requirement & only 3 have any side yard at all. Imposition of these side yard provisions would naturally eliminate the possibility of a Mews development and instead lead to an apartment block concept which we would consider less desirable for the site & for the neighborhood. Since the purpose of districting is to maintain the historic context & character of the existing buildings, (295-2 K) & (295-109 a&b), it seems inconsistent to apply 295-72.2 (e) to any building in this district. This interpretation was not imposed in carrying out our projects at 491-493a and 495 Warburton Avenue. Site plan proposed meets all criteria outlined in 295-109.		FRONT: 0' REAR: 0' SIDES: 10' (INCREASING 1' FOR EVERY 10' OF DEPTH AFTER 50'. SEE DWG ON SHEET 9) TOTAL WEST SIDE IS 27' TOTAL EAST SIDE IS 25'	0' @ FRONT 0' @ WEST 10' @ EAST +/- 150' @ NORTH	FRONT: 0' REAR: 1' EAST: 13'-9" WEST: 0'	RELIEF FROM 295-72E (1) RELIEF FROM 295-20G ENCROACHMENTS TOTAL IS 7,194 SF SEE DWG 9
HEIGHT LIMITS **(SEE SHEETS 12, 13 & 14)** 295-5 "HEIGHT, BUILDING" B (1) & B (2) + 295-72-2 (E) 3 (a) & (b) limiting height to 40'.	All buildings are in compliance with 295.72.2 (E)				
EXITWAY/CONNECTION TO TRAIN STATION We propose a gravel pathway approximately 4' wide to connect the exit stair on the north end of the development to existing old stairs in need of reconstruction at the SW corner of the station parking lot. (see sheet 1) These stairs give out to the sidewalk leading to Southside Avenue and the station. We are asking the village to enter into a reciprocal easement agreement with RTB Washington LLC or their designated condominium corporation, to allow RTB to construct and maintain this pathway and steps in perpetuity as a public pedestrian way. In turn the village would receive a public right of passage through the Mews at the Mews level to Washington Avenue. We contacted Erika Krieger of the New York DOS regarding obtaining a state code variance to permit an exit into a 4' wide path in lieu of the 10' wide laneway prescribed by the code. Erica thought this likely.	EXIT TO TRAIN STATION				A recommendation from the PB & ZBA to the B of T that such an easement be granted.

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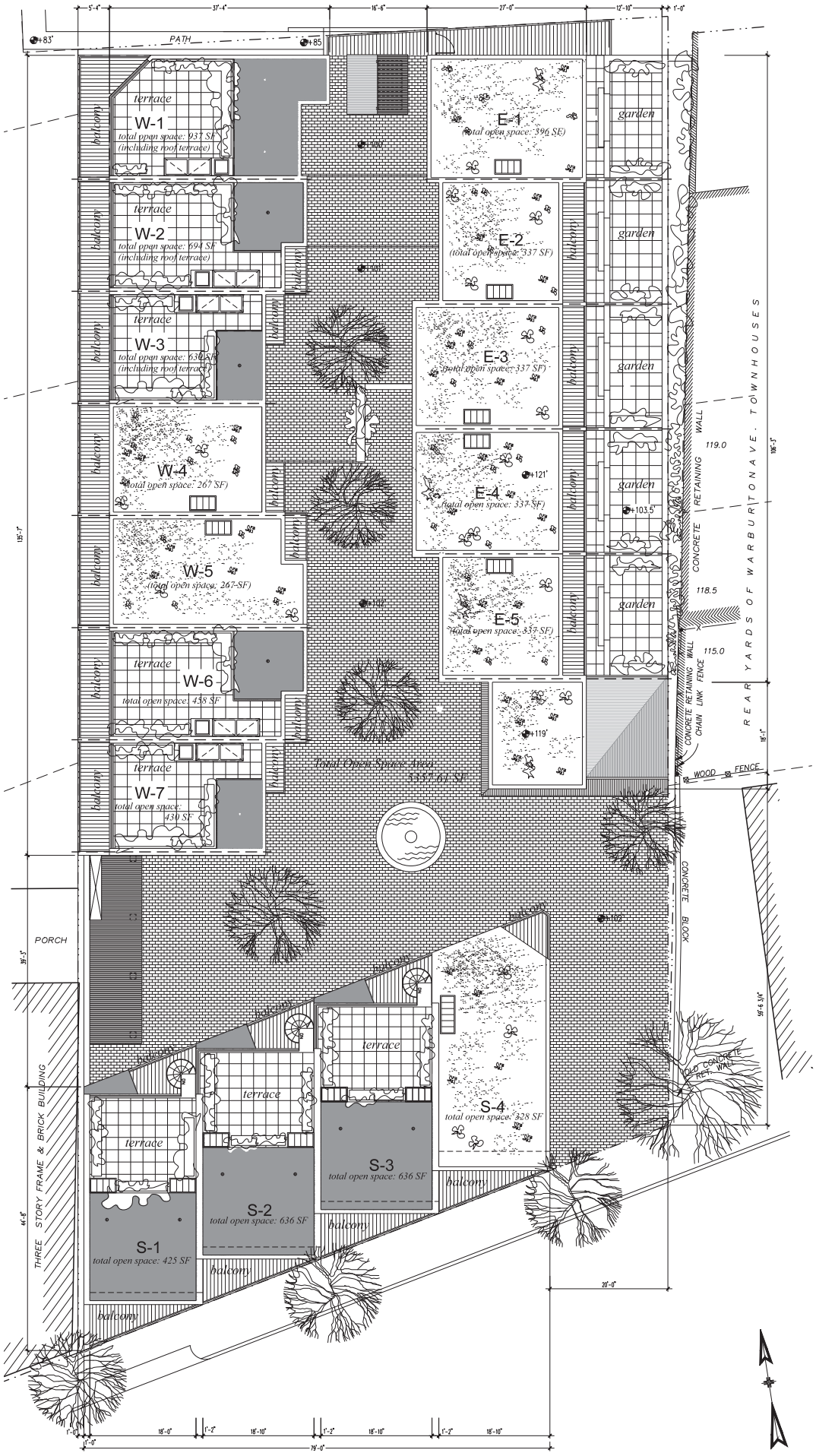
Project: **WASHINGTON MEWS**
RTB WASHINGTON LLC

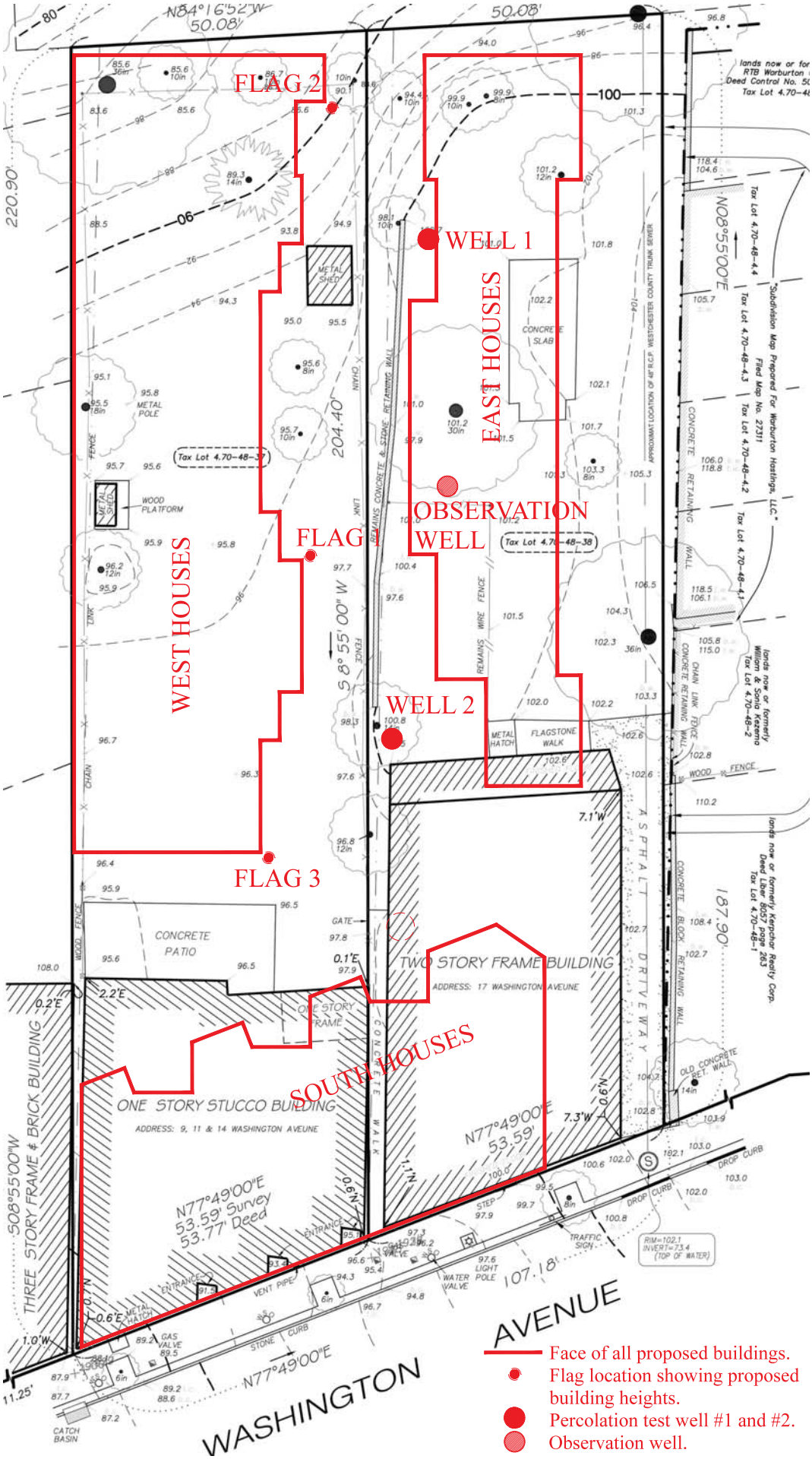
Sheet Title: **ZONING ANALYSIS**

Project No.: 1405
Date: 1 OCTOBER 2015
Scale:
Drawn:

Sheet No.: **10**



Baldwin & Franklin Architects 73 Washington Avenue Hastings-on-Hudson, N.Y. 10706 Tel.: (914) 693 5324 Fax: (914) 693 5676	Project: **WASHINGTON MEWS** **RTB WASHINGTON LLC**	Sheet Title: **Open Space**	Project No.: 1405 Date: Oct 1st, 2015 Scale: 1/8" = 1-0' Drawn: GA	Sheet No.: **15**



Baldwin & Franklin Architects 73 Washington Avenue Hastings-on-Hudson, N.Y. 10706 Tel.: (914) 693 5324 Fax: (914) 693 5676	Project: **WASHINGTON MEWS** **RTB WASHINGTON LLC**	Sheet Title: **Flag & Well Location**	Project No.: 1405 Date: Oct 1st, 2015 Scale: 1/8" = 1-0" Drawn: GA	Sheet No.: **16**